AD-A138 878 DRAFT ENVIRONMENTAL IMPACT STATEMENT WEST BANK HURRICANE PROTECTION LEVEE JEFFERSON PARISH LOUISIANA (U) ARMY ENGINEER DISTRICT NEW ORLEANS LA FEB 84 1/3

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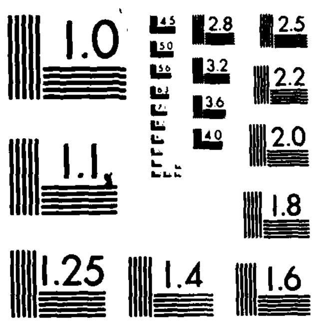

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

(12)

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

REPLY TO
ATTENTION OF:

DRAFT
ENVIRONMENTAL IMPACT STATEMENT

Proposed Plan for a Hurricane Protection Levee for the West Bank of Jefferson Parish Jefferson Parish, Louisiana

The responsible lead agency is the U. S. Army Engineer District, New Orleans.

The action being considered is issuance of a permit as provided by Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act, to the Jefferson Parish Council, for placement of dredged or fill material into wetlands.

Abstract: Jefferson Parish, located in southeast Louisiana, is without an adequate hurricane protection levee system for the populated areas in the southern part of the parish. The purpose of this document is to determine the environmental consequences of providing this hurricane protection. Seven levee alinements were studied. Constructing the levee would cause the impoundment of from 429 to 2,729 acres of wetlands, depending on the alinement, and subsequent blockage of free surface water exchange to the protected side of the levee. With the flood protection afforded by a levee, the enclosed wetlands located on the protected side of the levee will be subjected to increased developmental pressures.

SEND YOUR COMMENTS TO THE DISTRICT ENGINEER BY

District Engineer
U. S. Army Engineer District
P.O. Box 60267
New Orleans, Louisiana 70160
ATTN: LMNOD-SA

If you would like further information on this document, please contact:

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WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

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1. SUMMARY

1.1 Introduction

The Jefferson Parish Council submitted an application to the New Orleans District in June, 1981. This application was for a permit under Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act to conduct dredging and filling operations in tidal wetlands of Jefferson Parish, Louisiana, to construct a levee from near the Lake Cataouatche protection levee to Bayou des Familles. Because of the potential impacts of the proposed project it was determined by the District Engineer that an environmental impact statement would be required pursuant to provisions of the National Environmental Policy Act of 1969, to fully assess the impacts of the proposed project and feasible alternatives.

1.2 Purpose of and Need for the Proposed Project

The purpose of this draft environmental impact statement is to determine the environmental consequences of providing hurricane protection on the west bank of Jefferson Parish to the communities of Westwego, Marrero, and Estelle. Many hurricanes have struck the central gulf coast area since the early 1800s. The impact and severity of the storms have varied; however, in all cases, a severe threat has been posed to the affected communities. Another flooding source results from high tides which can occur simultaneously with heavy rainfall during passage of fronts caused by extratropical weather systems. It is the intent of the Jefferson Parish Council to protect the exposed communities from the storm surge that would accompany a major hurricane and from abnormally high tides caused by extratropical weather systems.

1.3 Alternatives

Seven levee alinements were studied in relationship to their impacts on the natural and human environments of the project area. Depending on which alternative is constructed, the impoundment of from 429 to 2,729 acres of existing wetland and forested habitat, and the subsequent restriction of free surface water exchange between the protected area and the flood side of the levee will occur. With the flood protection afforded by a levee, the enclosed wetland and forested communities located on the protected side of the levee will be subjected to increased development pressures. Of the seven alternatives described in the document, the alinement preferred and endorsed by the Jefferson Parish Council is Alternative D.

While the natural environmental impacts of constructing a levee are significant, benefits to the human environment are also significant. The most important aspect of the benefit to the human environment is the improved flood protection from hurricane surge and abnormally high tides. If constructed, the levee would provide protection from the

storm surge of the 100-year hurricane and lesser tropical storms, as well as other abnormally high tides. The area receiving protection represents 51 percent of the population of the project area or about 34,000 people. The proposed plans will not prevent flooding from rainfall within the project area, but the Jefferson Parish Council has been pursuing improved drainage through a number of other projects.

Construction of a levee along the Alternative D alinement will result in the raising of 59,000 liner feet of levee at a cost of about $14,000,000. This cost would be borne by Jefferson Parish, with no Federal funding.

1.4 Areas of Controversy

The potential loss of from 429 to 2,729 acres of valuable wetlands and forest habitat is a central issue in this proposed project. The wetlands enclosed by the levee will be subjected to stress for development. Water quality within wetlands on the protected side of the levee would be degraded. Proposed levee alinements A, C, and D penetrate deeply into the park protection zone of the Jean Lafitte National Historical Park and alter drainage patterns near the park.

1.5 Statutory Requirements

Following is a list of environmental and statutory requirements and the proposed project compliance thereto:

RELATIONSHIP OF THE PROPOSED LEVEE TO ENVIRONMENTAL AND STATUTORY REQUIREMENTS[1]

Requirements	Applicability
Section 9 of the River and Harbor Act (R&HA) of 3 March 1899	Not Applicable
Section 10, R&HA	Full Compliance
Section 11, R&HA	Not Applicable
Section 13, R&HA	Not Applicable
Section 14, R&HA	Not Applicable
Section 1 of the River and Harbor Act of 1902	Not Applicable
Section 404 of the Clean Water Act (CWA)	Partial Compliance
The Marine Protection, Research and Sanctuaries Act	Not Applicable

Section 401 of CWA	Full Compliance
National Environmental Policy Act	Partial Compliance
Fish and Wildlife Coordination Act	Full Compliance
Migratory Marine Game Fish Act	Not Applicable
Fish and Wildlife Act of 1956	Partial Compliance
Federal Power Act of 1929	Not Applicable
National Historic Preservation Act of 1966	Full Compliance
Interstate Land Sales Full Disclosure	Not Applicable
Endangered Species Act of 1973	Full Compliance
Deepwater Ports Act of 1974	Not Applicable
Marine Mammal Protection Act of 1972	Not Applicable
Wild and Scenic River Act	Not Applicable
Land and Water Conservation Fund Act of 1965	Not Applicable
Clean Air Act	Full Compliance
Floodplain Management (E.O. 11988)	Not Applicable
Protection of Wetlands (E.O. 11990)	Full Compliance
Louisiana Air Control Act	Full Compliance
Louisiana Archaeological Treasure Act	Full Compliance
Louisiana Historic District Preservation Act	Not Applicable
Louisiana Scenic Streams Act	Not Applicable
Louisiana Coastal Resources Program	To Be Determined
Area-wide Comprehensive Plan	Not Applicable

[1]/The compliance categories used in this table were assigned based on the following definitions:

a. Full Compliance - All regulatory procedures of the statute, or other policy and related regulations have been met.

b. Partial Compliance - Some regulatory procedures of the statute, or other policy and related regulations remain to be met.

c. Noncompliance - None of the regulatory procedures of the statute, or other policy and related regulations have been met.

d. Not Applicable - Statute, or other policy not applicable.

e. To Be Determined - The state agency has not made a determination.

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2. PURPOSE, NEED AND HISTORY OF PROPOSED ACTION

The objective of the Jefferson Parish Council is to provide increased hurricane tidal surge protection from a 100-year frequency storm within the Barataria Basin on the west bank of Jefferson Parish, Louisiana. The study area, lying adjacent to the west bank of the Mississippi River, directly opposite the City of New Orleans, extends southward to the Gulf Intracoastal Waterway in the vicinity of the community of Crown Point, Louisiana. Bayou Segnette and the Harvey Canal form the western and eastern boundaries, respectively. The study area lies solely within Jefferson Parish and is part of the New Orleans Standard Metropolitan Statistical Area (NOSMSA). The northern portion consists of highlands formed by alluvial river deposits; sloping downward in the southern portion, the area is primarily wooded swamp and marshland lying at or below local sea level. Because the Jean Lafitte National Historical Park Core Area and its protection zone fall within and in close proximity to the project area, these boundaries are included on the project base map as illustrated throughout this document. The total study area encompasses some 18,000 acres of which 4,700 acres are devoted to residential usage, 850 acres are cleared and/or under development, 850 acres are in industrial development, 900 acres are in commercial development, and 1,375 acres are devoted to public usage (schools, churches, drainage and pumping stations, roads, bridges, etc.). The remaining 9,325 acres encompasses approximately 2,700 acres of primarily wetlands and 6,625 wooded acreage. The overall project area and its proximity to the park area is illustrated in Plate 1. For the purpose of this environmental impact statement, an ecological project area comprising approximately 4,477 acres within the overall project area has also been established. This area is bounded by Lapalco Boulevard on the north, the alinement of Alternative A on the south and west, and Louisiana Highway 45 on the east.

As presented in Section 4.1.2, many hurricanes have struck the Central Gulf Coast area since the early 1800s. The impact and severity of the storms have varied; however, in all instances, they have posed a threat to affected communities. It is the intent of Jefferson Parish to protect the exposed communities on the west bank from the storm surge that would accompany a major hurricane.

In the event of a storm of the magnitude expected to occur once every 100 years, protection from tidal surge would be provided by means of a levee system to the area located below the 100-year overflow limit within the levee alinement. This area currently encompasses some 2,400 residential acres and 1,150 acres in commercial, public, and industrial usage.

Although a number of separate levees protect localized areas of development, incomplete and substandard sections of these levees do not provide adequate protection.

A 100-year flood would potentially result in a storm surge with accompanying water elevations between 4.5 and 6.0 feet National Geodetic Vertical Datum[1] (U.S. Army Corps of Engineers, 1981b). Some urbanized sections of the project area would be inundated by flood waters, resulting in moderate to severe damages to residences, businesses, industries, and public facilities. Construction of a hurricane levee system would prevent the damages from tidal surges of this magnitude.

In the recent past, major hurricanes such as Betsy (1965) and Camille (1969) had significant impacts on the Jefferson Parish area. Betsy caused $11,700,000 in damages from tidal overflow and inundated 146,500 acres. The highest stage in Barataria, Louisiana, immediately south of the project area, was 2.7 ft. NGVD during Hurricane Betsy and 1.9 ft. NGVD during Hurricane Camille. No flooding was [illegible]perienced in the project area. In these two instances Jefferson [illegible]is[illegible] was more fortunate than some other adjacent parishes where da[illegible]es were more severe and flood elevations were greater. Historicall[illegible] [illegible]e west bank of Jefferson Parish has been susceptible to flooding fr[illegible]oth hurricane surge and high tidal waters associated with extratrop[illegible] [illegible]vents that may cause heavy rainfall. During the rainstorm of M[illegible], 1978, the stage at Barataria on Bayou Barataria was 2.3 feet NGVD because of strong onshore winds which accompanied the rain storm. Nearby, in the city of Algiers the measured rainfall on this day was 9.8 inches. On April 13, 1980, the rainfall measured in Algiers was 9.7 inches an the accompanying stage at Barataria was 3.8 feet NGVD. Note that this stage is almost the same as the peak hurricane stage which occurred during the passage of hurricane "Babe" in 1977. Babe was a hurricane of minimal strength. The severity of flooding under these conditions emphasizes the potential for dangerous flooding during the passage of a strong hurricane on a similar or more critical path for the project area.

The Jefferson Parish Council began studying hurricane protection on the west bank in the early 1960s. In November, 1965, the U. S. Congress authorized the Corps to conduct feasibility studies. After completion of these studies, a public meeting was held in July, 1972. In March, 1973, the Jefferson Parish Council was notified that further study of the levee would be delayed until the Jean Lafitte National Historical Park boundaries were determined. In mid-1974, the levee studies were resumed. In the latter part of 1977, the Corps developed alternative alinements for review and approval by the Jefferson Parish Council and the National Park Service. The parish selected a preferred alinement, which was later revised because of comments from the National Park Service and the U. S. Environmental Protection Agency.

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[1] All elevations herein are expressed in feet referenced to National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as mean sea level (msl).

In September, 1979, the Jefferson Parish Council was sent a map with the suggested Federal alinement with a request for their views. The council has never replied to this request except to advise in a report accompanying their original October 29, 1980, application that their "...application for the construction permit has evolved from a determination by the Jefferson Parish Council that it is in the public interest to construct the levee system without Federal funding and the ensuing delays..."

After several meetings with the Corps, the parish submitted a revised application in June, 1981. A determination was made by the New Orleans District that an environmental impact statement would be required, and a public scoping meeting was held on August 13, 1981.

3. ALTERNATIVES

3.1 Introduction.

Preliminary planning and engineering efforts evaluated the time and cost required to construct a hurricane protection levee to federal standards. If a levee were constructed with federal participation, it is estimated that the project would take from eight to ten years to complete versus one to three years if undertaken by Jefferson Parish. The cost comparisons shown herein for local standards do not include any cost to add fill to compensate for future settlement. Furthermore, the value of Jefferson Parish's contribution to such a project would not be substantially less than the cost of constructing a levee to local standards without federal participation. Given the comparable cost of constructing the levees and the great difference in the time required for implementation, a determination was made to pursue the construction of the levee without federal participation.

3.2 Design Considerations.

Preliminary engineering designs for the levee alternatives utilized are shown in Plate 2. The levees would have a stability factor of 1.3 against failure as required by the Federal Emergency Management Agency's Interim Levee Policy of February 10, 1981. Construction would be to an elevation of +10 feet NGVD, with an anticipated settlement to an elevation of +5.0 feet NGVD, five to seven years after construction. At this time, a second lift to elevation +10.0 will be required to raise the levee to a minimum grade of +8.0 to +10.0 feet NGVD.

Construction of the levee would utilize the "cast-fill" method with contiguous borrow pits. The required rights-of-way were established based on a safety factor of 1.5 for the borrow pits. The earthen material quantities for the alinement were calculated using the following criteria:

- A levee shrinkage (compaction) of 30 percent, with a borrow pit loss (wasted material) of 75 percent to calculate the required volume of borrow;

- A maximum borrow pit depth of 15 feet to establish the borrow pit widths, and;

- A minimum distance of 90 feet between the borrow pit and the levee centerline for each cross section to satisfy stability.

Cantilevered floodwalls consisting of interlocking steel sheet piling driven into the ground and capped with concrete would be used within areas of the City of Westwego where there is insufficient right-of-way for an earthen levee. Openings within the floodwall would consist of

concrete stoplog closures t allow ingress and egress to the harbor areas. Access to and across the earthen levee sections would be provided by ramps and shell roadways.

Each alternative alinement would incorporate the new Westwego and Ames Pumping Stations. Costs and right-of-way requirements for levees associated with these projects have not been included because they were funded under separate projects.

Water exchange structures would be included within the levee where Alternatives C and D cross wetlands in the Bayou des Familles area. Alternatives B, E, F and G also include a water exchange structure under Louisiana Highway 45 in the Bayou des Familles area. The structures would consist of two 60-inch corrugated metal culverts with slide-flap gates constructed on the floodside (Plate 3). Construction of slide-flap gates would allow flow flexibility in the following manner:

> The normal condition for the drainage control structure is for the flap gate to be in the raised position.
>
> When outside stages are predicted to be higher than +2 ft. NGVD due to abnormally high tides caused by winds the flap gates will be lowered so that drainage waters can be allowed to flow out of the protected areas only.

The alternatives would cross two major roadways, Louisiana Avenue and Louisiana Highway 45. Asphalt road ramps (Plate 4) would cross the levee at these locations.

3.3 Alternatives.

The alternatives (Plate 5) have been divided into six reaches. Alternatives A, B, C, and D, are divided into Reaches A through G. The reach delineations for Alternatives E, F and G differ from Alternatives A through D because of alinement variations in the Westwego and lower CIT areas. Alternative A's alinement is presented by reach, and the subsequent alinements are described in those reaches where they differ from Alternative A. The Federal levee standards would result in approximately the same length of levee in each reach, but there would be some differences because of the construction requirements. For Alternative A, the wetland area south of Oak Cove between the new levee and Highway 45 will be drained by the new Ames pumping station. For Alternative B, the same drainage pattern is established, although the additional area drained is smaller than for Alternative A. For Alternative C, two water exchange structures provide gravity drainage through the new levee. Details of these structures are shown in Plate 3. For Alternative D, the same drainage pattern is established as for C. For Alternative E, the area is drained as for Alternative B. In addition, Alternative E requires a small pump to maintain existing water levels in the CIT tract. For Alternative F, the same drainage patterns are established as for Alternative E, but an additional area west of CIT tract also requires a small pump to maintain existing water levels. For Alternative G, the drainage system is the same as Alternative E.

3.3.1 Alternative A (Plate 6).

The rights-of-way required for the construction of this levee alinement from Reach C through F may be donated by the respective land owners, if all land enclosed would be prepared for drainage and subsequent development.

- Reach A to B (6,750 linear feet) would begin at the Bayou Segnette Pumping Station as a floodwall and generally parallel the Bayou going north to Louisiana Avenue where it would change to a levee. The levee would proceed south and follow the alinement of the existing potato ridge levee. Along Laroussini Avenue, the flood protection would again change to a floodwall which would cross on the discharge side to the existing Westwego Pumping Station.

- Reach B to C (11,950 linear feet) would begin just south of the intersection of Mayronne Canal and Bayou Segnette. It would continue southward following Bayou Segnette for approximately 4,500 feet. It would then continue eastward, ending just east of the Dugues Canal. This alternative would require plugging five gas wells at a cost of $75,000. This cost will either be undertaken by Jefferson Parish or the affected oil company(s). In addition, the Bayou Segnette Oil Field boat docking facilities located west of the Westwego Airport would have to be relocated to the floodside of Alternative A. This would cost $250,000. The pipeline canal system north of this alinement would become internal.

- Reach C to D (4,200 linear feet) would continue eastward utilizing the existing levee which is the southern border of the lower CIT tract. The levee would be flanked by borrow pits within this reach.

- Reach D to E (10,260 linear feet) would proceed south from point D, to Millaudon Canal, and would require a tie-in to the new Ames Pumping Station levee, east of this reach's terminus. Construction of this alinement would require relocation of one high pressure gas line near the new Ames Pumping Station at a cost of $150,000 which would be paid by either Jefferson Parish or the affected oil company(s).

- Reach E to F (28,850 linear feet) would continue to follow the south bank of Outfall Canal to its intersection with Millaudon Canal. At this point, the levee would cross Millaudon Canal and reroute its flow into the protected side borrow pit which would be

contiguous with the new levee. The levee would continue along the south banks of Millaudon Canal and Bayou Boeuf and then turn southward to follow the east bank of a borrow canal to its intersection with Kenta Canal. The levee would the proceed southward, following the east bank of the borrow canal which parallels Kenta Canal. It would then turn east to Louisiana Highway 45. Within this reach, the levee would be constructed using one borrow pit on the protected side of the levee. This pit would serve as a main interior collection canal with the completion of the levee. Water exchange structures would not be included within this reach for Alternative A. The area enclosed by the levee within this reach would be drained via the new Ames Pumping Station.

- Reach F to G (1,900 linear feet) would cross Louisiana Highway 45 and Bayou des Familles to tie in with the existing "V-shaped Levee." A ramp at the intersection of Louisiana Highway 45 and the levee would be required.

3.3.2 Alternative B (Plate 7).

This alternative alinement corresponds to Alternative A with the exception of Reaches B to C, D to E, and E to F.

- Reach B to C (10,950 linear feet) would extend from the intersection of Mayronne Canal and Bayou Segnette south-eastward to the Westwego Airport Canal. The levee would then follow the west bank of Airport Canal in a southerly direction. This alinement would close the south ends of the Westwego Airport and Dugues Canal as it proceeded eastward, utilizing the existing levee which is the southern border of the lower CIT tract. Reach B to C would end just west of the Dugues Canal. The levee would be constructed by digging a borrow pit on either side, one of which would function as an interior drainage canal.

- Reach D to E (6,000 linear feet) would continue to utilize the existing southern levee of the lower CIT tract until its intersection with the west bank of the Outfall Canal. Plans for the new Ames Pumping Station include improvements to the levee which borders the west bank of the Outfall Canal. This reach will include 2,970 linear feet of the new Ames Pumping Station levee. No costs for this portion would be associated with Alternative B. The levee project would continue west of the new Ames Pumping Station and generally follow the south bank of Millaudon Canal. Construction of the levee on the south side of the Ames Pumping Station would require rerouting the discharge canal and closure

of the Outfall Canal at its junction with the levee. Within this reach, construction would require the relocation of two high pressure gas lines at an estimated cost of $300,000 which would be borne by either Jefferson Parish or the affected oil company(s).

- Reach E to F (18,460 linear feet) would generally follow the wetland-non-wetland interface west of Louisiana Highway 45. At point E, this alinement would turn south, tying into the existing back levee at Tusa Drive. The levee would continue south, paralleling Nature Drive to intersect with Woods Place Canal. It would then turn eastward a short distance, and again southward, paralleling Woods Place Canal to point F. Water exchange structures would not be located within Reach E to F, because this area would be drained by the new Ames Pumping Station via the new borrow pit canal.

3.3.3 Alternative C (Plate 8).

This alternative alinement differs from Alternative A in the following Reaches: A to B, B to C, D to E and E to F.

- Reach A to B (3,160 linear feet) would include a double sector navigation flood gate (Plate 9) across Bayou Segnette. Bayou Segnette would be coffer-dammed and the flood gate would be constructed with an opening of approximately 56 feet and a sill depth of 12 feet to allow for navigation ingress and egress to the Westwego Harbor. The flood gate would be located north of the existing Bayou Segnette Pumping Station. In the event of a hurricane, this location would allow the flood gate to be closed and the pumping station to operate. This alternative would eliminate the need for construction of the section of the levee from Reach A to B, of the other alternatives, and thereby minimize the impact of levee construction within the urbanized area of Westwego.

- Reach B to C (10,950 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2.

- Reach D to E (6,000 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2. This reach would contain 2,970 linear feet of levee built under the new Ames Pumping Station Project.

- Reach E to F (28,850 linear feet) would follow the same alinement discussed under Alternative A, Section 3.3.1. However, two water exchange structures would be included for this alternative.

3.3.4 Alternative D (Plate 10).

Alternative D represents the alinement preferred by the Jefferson Parish Council. It differs from Alternative A in the following reaches: B to C, D to E and E to F. One of the primary reasons that the Jefferson Parish Council favors this alinement is because they currently expect to acquire significant rights-of-way by donation.

- Reach B to C (10,950 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2.

- Reach D to E (6,000 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2. This reach would include 2,970 linear feet of levee built under the new Ames Pumping Station project.

- Reach E to F (28,850 linear feet) would follow the same alinement discussed under Alternative A, Section 3.3.1. However, two water exchange structures would be included.

3.3.5 Alternative E (Plate 11).

This alternative corresponds to Alternative A within two of the seven reaches, A to B and F to G. The remaining five reaches, B to 1, 1 to 2, 2 to 3, 3 to E, and E to F are discussed below.

- Reach B to 1 (11,300 linear feet) would follow the back levee south of Lapalco Boulevard and then turn south following the western border of the Westwego Airport.

- Reach 1 to 2 (8,700 linear feet) would proceed east from the southern end of the Westwego Airport, following the boundary between the upper and lower CIT tracts. The levee would tie into the planned Outfall Canal levee at point 2 near the Orleans Village Pumping Station.

- Reach 2 to 3 (2,970 linear feet) would proceed south along the west bank of the Outfall Canal. It is to be constructed under the new Ames Pumping Station Project. No cost for this reach would be associated with Alternative E.

- Reach 3 to E (2,500 linear feet) would generally follow the same alinement discussed under Reach D to E of Alternative B, Section 3.3.2.

- Reach E to F (18,460 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2.

3.3.6 Alternative F (Plate 12).

This alternative corresponds to Alternative A within two of the seven reaches, A to B and F to G. The remaining five reaches, B to 1, 1 to 2, 2 to 3, 3 to E, and E to F are discussed below.

- o Reach B to 1 (9,000 linear feet) would generally follow the same alinement discussed under Alternative A, Section 3.3.1. However, within this reach, Alternative F would enclose approximately 75 acres less than Alternative A.

- o Reach 1 to 2 (8,700 linear feet) would follow the same alinement discussed under Alternative E, Section 3.3.5.

- o Reach 2 to 3 (2,970 linear feet) would follow the same alinement discussed under Alternative E, Section 3.3.1.

- o Reach 3 to E (2,500 linear feet) generally would follow the same alinement discussed under Reach D to E of Alternative B, Section 3.3.2.

- o Reach E to F (18,460 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2.

3.3.7 Alternative G (Plate 13).

This alinement corresponds to Alternative A within two of the six reaches, A to B and F to G. The remaining four reaches, B to 1, 1 to 3, 3 to E, and E to F are discussed below.

- o Reach B to 1 (11,300 linear feet) would follow the same alinement discussed under Alternative E, Section 3.3.1.

- o Reach 1 to 3 (10,700 linear feet) would extend from the south end of the Westwego Airport Canal east to the Outfall Canal along the southern border of the lower CIT tract. This alternative generally would follow the same alinement discussed under Alternative B, Section 3.3.2.

- o Reach 3 to E (2,500 linear feet) generally would follow the same alinement discussed under Reach D to E of Alternative B, Section 3.3.2.

- o Reach E to F (18,460 linear feet) would follow the same alinement discussed under Alternative B, Section 3.3.2.

3.3.8 Alternative H (No Action).

Alternative H is the "no-action alternative." Existing residential, commercial and industrial development in the communities of Westwego, Marrero, and Estelle would not be afforded flood protection in the event

of a storm expected to occur once every 100 years. Accordingly, if a storm of this intensity were to hit the project area, residents and commercial establishments would likely be inundated by storm waters. In addition, future development would be limited to those areas where homes could be constructed where the ground floor structural elevation would be at least equal to the 100-year overflow level. It is possible that even with the proposed levee, construction would have to remain at these same elevations due to the 100-year frequency rainfall levels.

3.4. Relationship of the West Bank Hurricane Protection Levee to Land Use and Other Plans.

The relationship of the proposed project to land use and other plans is similar under each alternative. All of the alternatives are consistent with local, regional, state and Federal plans, except the Jean Lafitte National Historical Park and the Louisiana Coastal Management Section.

The proposed levee is consistent with all parish plans, as follows:

- Development 2000: Comprehensive/Land Use Plan - This plan calls for the project area to be primarily developed for residential and commercial uses.

- The West Bank Master Drainage Plan - The proposed levee is included as an integral part of this plan. The plan also incorporates several pumping stations, including the new Ames and Westwego facilities, which are included in the proposed levee's alinement. These stations are illustrated in Plate 5.

- The Jefferson Parish Coastal Zone Management Plan Adopted May 4, 1983 - The proposed levee acts as the boundary for several environmental management units. The boundaries will automatically conform to any levee alinement implemented.

- Jefferson Parish Resolution 37936 - This resolution created the "Prohibited Service Area" as part of the Lafitte Waterline Project. According to the resolution, potable water will not be provided within the "Prohibited Area."

- Jefferson Parish Resolution 13796 - This resolution established the growth limit line for the Parish. It includes Jefferson Parish Resolution 37936 as well as the area located south of the project area.

- The West Bank Major Street Plan - This plan anticipates that the project area will be primarily developed for residential and commercial use. The plan calls for a number of major transportation improvements to be implemented in the project area as a result of expected

economic and population growth including the construction of State Road "A", a limited access freeway south of Lapalco Boulevard.

The proposed hurricane protection levee is also consistent with existing regional plans of the Regional Planning Commission. These plans include:

- <u>The Year 2000 Land Use Assessment</u> - This assessment estimates land uses in the Year 2000 by small geographic areas (traffic zones) for Jefferson Parish. The plan indicates that the primary uses will be residential and commercial with a growing industrial component.

- <u>The New Orleans Regional Transportation Study</u> - The emphasis of the plan is on suburban areas because anticipated development trends will require new and improved roadways. Improvements required because of continuing growth in the project area include the upgrading of River Road, U. S. Highway 90 and Louisiana Highway 45.

3.5 Comparative Table of Alternative Alinements.

The right-of-way requirements for each alternative are presented in Table 3.1. These requirements have been calculated based on preliminary engineering designs and the assumption that all rights-of-way needed for the levee would have to be acquired. A summary of levee costs, right-of-way acreages, linear feet, height and additional (beyond what is currently leveed) area enclosed are presented in Table 3.2 for each alternative. Table 3.2 presents a comparison table of the beneficial and adverse consequences of the various alinements.

TABLE 3.1
RIGHT-OF-WAY REQUIREMENTS FOR
ALTERNATIVE ALINEMENTS

ALTERNATIVE A	REACH A-B	REACH B-C	REACH C-D	REACH D-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR FEET	6750	11950	4200	10260	28850	1900	63910
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	15.34	37.86	13.31	32.50	91.40	6.02	196.43
BORROW PIT ACREAGE	33.99	70.64	32.98	60.65	170.54	11.23	380.03
TOTAL ACREAGE	49.33	108.50	46.29	93.15	261.94	17.25	576.46

ALTERNATIVE B	REACH A-B	REACH B-C	REACH C-D	REACH D-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR	6750	10950	4200	6000	18460	1900	48260
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	15.34	34.69	13.31	19.01	58.48	6.02	146.85
BORROW PIT ACREAGE	33.99	76.37	32.98	35.47	109.12	11.23	299.16
TOTAL ACREAGE	49.33	111.06	46.29	54.48	167.60	17.25	446.01

ALTERNATIVE C	REACH A-B	REACH B-C	REACH C-D	REACH D-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR FEET	3160	10950	4200	6000	28850	1900	55060
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	8.70	34.69	13.31	19.01	91.40	6.02	173.13
BORROW PIT ACREAGE	18.68	76.37	32.98	35.47	170.54	11.23	344.92
TOTAL ACREAGE	28.11	111.06	46.29	54.48	261.94	17.25	519.13

ALTERNATIVE D	REACH A-B	REACH B-C	REACH C-D	REACH D-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR FEET	6750	10950	4200	6000	28850	1900	58650
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	15.34	34.69	13.31	19.01	91.40	6.02	179.77
BORROW PIT ACREAGE	33.99	76.37	32.98	35.47	170.54	11.23	360.58
TOTAL ACREAGE	49.33	111.06	46.29	54.48	261.94	17.25	540.35

ALTERNATIVE E	REACH A-B	REACH B-1	REACH 1-2/3[1]	REACH 3-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR FEET	6750	11300	8700	2500	18460	1900	49610
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	15.34	35.80	27.56	7.92	58.48	6.02	151.12
BORROW PIT ACREAGE	33.99	78.05	51.43	14.78	109.12	11.23	298.60
TOTAL ACREAGE	49.33	113.85	78.99	22.70	167.60	17.25	449.72

ALTERNATIVE F	REACH A-B	REACH B-1	REACH 1-2/3[1]	REACH 3-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR FEET	6750	9000	8700	2500	18460	1900	47310
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	15.34	28.51	27.56	7.92	58.48	6.02	143.83
BORROW PIT ACREAGE	33.99	53.20	51.43	14.78	109.12	11.23	273.75
TOTAL ACREAGE	49.33	81.71	78.99	22.70	167.60	17.25	417.58

ALTERNATIVE G	REACH A-B	REACH B-1	REACH 1-2/3[1]	REACH 3-E	REACH E-F	REACH F-G	TOTAL PROJECT
LINEAR FEET	6750	11300	10700	2500	8460	1900	51610
RIGHT-OF-WAY							
LEVEE R.O.W. ACREAGE	15.34	35.80	33.90	7.92	58.48	6.02	157.46
BORROW PIT ACREAGE	33.99	78.05	63.25	14.78	109.12	11.23	310.42
TOTAL ACREAGE	49.33	113.85	97.15	22.70	167.60	17.25	467.88

[1]Figures shown are for Reach 1 to 2 for Alternatives E and F, and for Reach 1 to 3 for Alternative G. The Reach delineations for Alternatives E, F, and G differ from Alternatives A through D because of alinement variations in the Westwego and C.I.T. areas.

TABLE 3.2
COMPARISON OF ALTERNATIVE ALINEMENTS

WETLAND AREA (3)		TOTAL PROJECT COST (1)	TOTAL CONST COST (2)	R.O.W. COST	RELOCATIONS	COST	R.O.W. ACRES	LINEAR LEVEEESTIMATED FEETHEIGHT	ENCLOSED
ALTERNATIVE A	14,253	12,539	1,194	520	576	63,910	10	3,640	ACRES
ALTERNATIVE B	11,665	8,635	2,505	525	446	48,260	10	540	ACRES
ALTERNATIVE C	18,960	16,381	1,814	765	519	55,060	10	1,940	ACRES
ALTERNATIVE D	14,227	11,622	2,080	525	540	58,650	10	1,940	ACRES
ALTERNATIVE E	11,862	8,773	2,564	525	450	49,610	10	61	ACRES
ALTERNATIVE F	10,704	8,485	1,619	600	418	47,310	10	440	ACRES
ALTERNATIVE G	11,196	9,171	1,650	375	468	51,610	10	440	ACRES

[1] All amounts are presented in thousands of dollars?

[2] Includes 20% Contingencies, 10% Engineering and Design, and 2.5% Supervision and Administration. Cost includes 1st and 2nd lift at Nov 83 prices.

[3] The estimated additional area enclosed is defined as that acreage located between the wetland/nonwetland boundary and each levee alinement.

Table 3.3

Comparative Impacts of Alternatives

Alternative	Consequences: Beneficial	Consequences: Adverse
A	Would restrict runoff and drainage from Westwego Sanitary Landfill from entering adjacent wetlands and surface waters.	Localized dissolved oxygen depression, elevated oxygen demands, nutrient and trace metals concentrations, and high turbidity and suspended particulate levels during dredge-and-fill operations. Would alter present drainage patterns in the protection zone of the Jean Lafitte National Park and reduce tidal exchange between wetlands on the protected and flood sides of the levee in this area by about 82%. Urban runoff and wastewater effluent discharges from pumping stations.
B	Would restrict runoff and drainage from Westwego Sanitary Landfill from entering adjacent wetlands and surface waters. Would not alter present runoff and drainage patterns in the protection zone of the Jean Lafitte Park or affect tidal exchange.	Localized dissolved oxygen depression, elevated oxygen demands, nutrient, and trace metals concentrations, and high turbidity and suspended particulate levels during dredge-and-fill operations. Urban runoff and wastewater effluent discharges from pumping stations.
C	Same as A	Same as A
D	Same as A	Same as A

Table 3.3 (continued)

Alternative	Consequences: Beneficial	Consequences: Adverse
E	Would not alter present drainage patterns in the protection zone of the Jean Lafitte Park or affect tidal exchange.	Localized dissolved oxygen depression, elevated oxygen demands, nutrient, and trace metals, concentrations, and high turbidity and suspended particulate levels during dredge-and-fill operations. Urban runoff and wastewater effluent discharge from pumping stations. Would not restrict runoff and drainage from Westwego Sanitary Landfill from entering adjacent wetlands and surface waters.
F	Same as B	Same as B
G	Same as E	Same as E

SOCIO-ECONOMIC AND LAND USE
SIGNIFICANT RESOURCES

Existing Condition: The project area is a rapidly developing portion of the New Orleans Standard Metropolitan Statistical Area. The 1980 population of 66,681 represented an increase of 43.1 percent over the 1970 estimate of 46,594. Approximately 51 percent of the residential development (2,400 acres) is subject to overflow from tidal surges associated with hurricanes having a return frequency of once in 100 years. Storms with a greater magnitude would inundate a larger area but the proposed plan(s) would not alleviate this condition. Historically, flooding in the area has resulted from ponded rainfall, a situation which would not be alleviated by the proposed plan(s). There would be no displacement of farms with project implementation.

Alternative	Consequences: Beneficial	Consequences: Adverse
A	Affords improved flood protection from tropical and	Increased flooding from ponded rainfall.

Table 3.3 (continued)

Alternative	Consequences Beneficial	Adverse
	abnormally high tides caused by extratropical storms.	Requires floodgate to gain access to Bayou Segnette dock area.
	Direct and indirect creation of jobs.	Requires 576 acres for use as right-of-way.
	Generates cost savings with possible donation of 69.7 percent of rights-of-way ($832,000; 401 acres).	Encourages future drainage of wetlands with induced urban development of up to 2,729 acres.
	Encloses 3,640 additional acres, some of which are developable.	Is partially constructed in an urbanized area-some displacement of people.
	Increased community cohesion from increased hurricane flood protection.	Increased noise levels during construction and maintenance periods.
	Stimulation of economic base with continued area growth and property value increases.	Some degradation of esthetic values.
	Increased tax base to provide additional public services and facilities.	
B	Affords improved flood protection from tropical and abnormally high tides caused by extratropical storms.	Increased flooding from ponded rainfall.
	Direct and indirect creation of jobs.	Requires 446 acres for use as right-of-way of which 167.6 acres (E to F) are currently developable.
	Encloses 540 additional acres, some of which are developable.	Encourages future drainage of wetlands with induced urban development of up to 981 acres.
	Increased community cohesion from increased hurricane flood protection.	Is partially constructed in an urbanized area-some displacement of people.
	Stimulation of economic base with continued area growth	Increased noise levels during

Table 3.3 (continued)

Alternative	Consequences	
	Beneficial	Adverse
	and property value increases. Increased tax base to provide additional public services and facilities.	construction and maintenance periods. Some degradation of esthetic values.
C	Affords improved flood protection from tropical and abnormally high tides caused by extratropical storms. Direct and indirect creation of jobs. Encloses 1,940 additional acres, some of which are developable. Increased community cohesion from increased hurricane flood protection. Stimulation of economic base with continued area growth and property value increases. Increased tax base to provide additional public services and facilities.	Increased flooding from ponded rainfall. Requires 519 acres for use as right-of-way. Encourages future drainage of wetlands with induced urban development of up to 2,223 acres. Is partially constructed in an urbanized area-some displacement of people. Increased noise levels during construction and maintenance periods. Some degradation of esthetic values.
D	Same as C	Increased flooding from ponded rainfall. Requires 540 acres for use as right-of-way. Requires floodgate to gain access to Bayou Segnette dock area. Encourages future drainage of wetlands with induced urban development of up to 2,223 acres. Is partially constructed in a

Table 3.3 (continued)

Alternative	Consequences: Beneficial	Consequences: Adverse
		urbanized area-some displacement of people. Increased noise levels during construction and maintenance periods. Some degradation of esthetic values.
E	Affords improved flood protection from tropical and abnormally high tides caused by extratropical storms. Direct and indirect creation of jobs. Encloses 61 additional acres, some of which are developable. Increased community cohesion from increased hurricane flood protection. Stimulation of economic base with continued area growth and property value increases. Increased tax base to provide additional public service and facilities.	Increased flooding from ponded rainfall. Requires 450 acres for use as right-of-way of which 167.6 acres (E to F) are currently developable. Requires floodgates to gain access to Bayou Segnette dock area. Encourages future drainage of wetlands with induced urban development of up to 430 acres. Is partially constructed in an urbanized area-some displacement of people. Increased noise levels during construction and maintenance periods. Does not provide protection to approximately 100 acres of developed land. Some degradation of esthetic values.
F	Affords improved flood protection from tropical and abnormally high tides caused by extratropical storms.	Increased flooding from ponded rainfall. Requires 418 acres for use as right-of-way, of which

Table 3.3 (continued)

Alternative	Consequences	
	Beneficial	Adverse
	Direct and indirect creation of jobs.	167.6 acres (E to F) are currently developable.
	Encloses 440 additional acres, some of which are developable.	Requires floodgates to gain access to Bayou Segnette dock area.
	Increased community cohesion from increased hurricane flood protection.	Encourages future drainage of wetlands with induced urban development of up to 659 acres.
	Stimulation of economic base with continued area growth and property value increases.	Is partially constructed in an urbanized area-some displacement of people.
	Increased tax base to provide additional public service and facilities.	Increased noise levels during construction and maintenance periods.
		Does not provide protection to approximately 100 acres of developed land.
		Some degradation of esthetic values.
G	Same as F	Increased flooding from ponded rainfall.
		Requires 468 acres for use as right-of-way of which 167.6 acres (E to F) are currently developable.
		Requires floodgates to gain access to Bayou Segnette dock area.
		Encourages future drainage of wetlands with induced urban development of up to 843 acres.
		Is partially constructed in an urbanized area-some displacement of people.

Table 3.3 (continued)

Alternative	Consequences
Beneficial	Adverse
	Increased noise levels during construction and maintenance periods.
	Does not provide protection to approximately 100 acres of developed land.
	Some degradation of esthetic values.

4. AFFECTED ENVIRONMENT

4.1 Environmental Conditions.

4.1.1 Project Location/Topography.

Jefferson Parish is located in southeastern Louisiana, adjacent to the City of New Orleans. It is bordered by Lake Pontchartrain to the north, New Orleans on the northeast, Plaquemines Parish to the southeast, the Gulf of Mexico to the south, Lafourche Parish to the southwest and St. Charles Parish to the northwest. The Mississippi River divides the Parish into two distinctly different communities. Land usage in the parish is dependent upon its location in relationship to the Mississippi River. The project location is on the west bank of the river. On this bank, there is a greater variation in the types of development. Adjacent to the river and the major highways, development is primarily industrial and commercial. Residential areas are cropping up adjacent to these areas. It appears that residential development will continue to expand, since the west bank provides the only large tracts of land left for development in the parish. Further south on the west bank, the small fishing villages of Lafitte and Barataria and the town of Grand Isle are the only developed areas.

The boundaries of the project area and its natural environmental component were identified in Section 2 and illustrated in Plate 1. For various alternative alinements, the acreage of natural environment and human environment will change as the area that is protected from hurricane surge varies. Obviously, the natural area which is modified will increase as the levee alinement moves further from the existing protection line into the marsh area. Likewise, the area which is protected from hurricane surge will also increase as the levee alinements extend further westward and southward from currently protected areas.

4.1.2. Climate, Climatic Hazards.

The climate of the area is humid, subtropical, and strongly influenced by the Gulf of Mexico. Throughout the year, warm, moist air from the gulf modifies the relative humidity and temperature conditions over the marshes, and decreases the range between hot and cold temperature extremes. When southerly winds prevail, these maritime effects are increased. Frequently, extended periods of stable humidity and temperature occur. During winter, the climate alternates between cold continental air and tropical air. Prevailing winds in summer transport warm, moist air northward providing favorable conditions for thunderstorms. Summer is also the principal season for occasional tropical storms or hurricanes. Temperatures in the study area are influenced by warm gulf waters. Based on the period of record from 1941 through 1970, the average annual temperature is about 68°F. A climatological summary of New Orleans is shown in Table 4.1.

TABLE 4.1

CLIMATOLOGICAL DATA SUMMARY FOR NEW ORLEANS

Normals, Means, and Extremes

Month	Temperatures °F: Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal Degree days Base 65 °F: Heating	Cooling
(a)				33		33			
J	62.3	43.5	52.9	83	1957	14	1963	403	20
F	65.1	46.0	55.6	85	1972	19	1970	299	35
M	70.8	50.9	60.7	87	1963	26	1960	188	55
A	78.9	58.8	68.8	91	1968	32	1971	29	137
M	84.9	65.3	75.1	96	1953	41	1960	0	313
J	89.6	71.2	80.4	100	1954	55	1972	0	462
J	90.4	73.3	81.9	99	1951	60	1967	0	524
A	90.6	73.1	81.9	100	1951	60	1968	0	524
S	86.6	69.7	78.2	97	1954	42	1967	0	396
O	79.4	59.6	69.6	92	1977	35	1968	40	189
N	70.3	49.8	60.1	86	1970	24	1970	179	32
D	64.2	45.3	54.8	84	1978	17	1962	327	11
YR	77.7	58.9	68.3	100	JUN 1954	14	JAN 1963	1465	2706

Month	Precipitation in inches: Water equivalent: Normal	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)		33		33		33		33		33	
J	4.53	13.63	1978	0.54	1960	6.08	1978	0.1	1973	0.1	1973
F	4.62	12.49	1979	1.07	1962	5.60	1961	2.0	1958	2.0	1958
M	5.49	19.09	1948	0.24	1955	7.87	1948	T	1959	T	1959
A	4.15	10.47	1973	0.26	1976	5.18	1977	0.0		0.0	
M	4.20	14.33	1959	0.90	1969	9.86	1959	0.0		0.0	
J	4.74	12.28	1975	0.23	1970	4.19	1953	0.0		0.0	
J	6.73	11.46	1954	2.91	1977	4.30	1966	0.0		0.0	
A	5.27	16.12	1977	1.69	1976	4.82	1975	0.0		0.0	
S	5.50	16.70	1971	0.24	1953	6.50	1971	0.0		0.0	
O	2.26	6.45	1959	0.00	1978	3.44	1975	0.0		0.0	
N	3.88	14.58	1967	0.21	1949	6.72	1975	T	1950	T	1950
D	5.13	10.77	1967	1.46	1950	4.85	1973	2.7	1963	2.7	1963
YR	56.77	19.09	MAR 1948	0.00	OCT 1978	9.86	MAY 1959	2.7	DEC 1963	2.7	DEC 1963

Month	Relative humidity pct.: Hour 00 (Local time)	Hour 06	Hour 12	Hour 18	Wind: Mean speed m.p.h.	Prevailing direction	Fastest mile: Speed m.p.h.	Direction	Year	Pct. of possible sunshine	Mean sky cover, tenths, sunrise to sunset
(a)	31	31	31	31	31		20	20		6	31
J	83	85	67	73	9.5		46	21	1975	46	6.8
F	82	84	63	67	9.9		43	26	1970	50	6.1
M	82	85	61	65	10.1		37	18	1969	56	6.3
A	85	88	60	66	9.3		35	07	1960	65	5.7
M	86	89	60	65	8.2		55	36	1973	59	5.3
J	86	89	62	67	6.9		48	05	1971	66	5.1
J	89	91	66	73	6.2		44	13	1979	56	6.3
A	89	91	66	73	6.0		42	33	1969	55	5.8
S	87	89	66	75	7.3		69	09	1965	58	5.4
O	86	88	59	72	7.5		40	17	1964	71	4.3
N	84	86	61	74	8.7		30	31	1969	57	5.1
D	83	86	66	75	9.1		46	28	1973	56	6.2
YR	85	88	63	70	8.3		69	09	SEP 1965	59	5.7

Month	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility ½ mile or less	Temperatures °F: Max: (b) 90° and above	32° and below	Min: 32° and below	0° and below	Average station pressure mb. Elev. feet m.s.l.
(a)	31	31	31	31	31	31	31	33	33	33	33	7
J	7	7	17	10	0	2	7	0	*	5	0	1019.9
F	8	7	13	9	*	3	*	0	0	3	0	1018.4
M	8	8	15	9	0	4	*	0	0	1	0	1016.7
A	8	11	11	7	0	4	2	*	0	*	0	1015.9
M	10	12	9	8	0	6	1	3	0	0	0	1013.7
J	10	13	7	10	0	9	*	16	0	0	0	1015.2
J	5	15	11	15	0	16	*	20	0	0	0	1015.8
A	8	14	9	13	0	13	*	19	0	0	0	1015.9
S	10	10	10	10	0	7	*	8	0	0	0	1016.2
O	16	8	7	5	0	2	2	1	0	0	0	1017.3
N	11	8	11	7	0	2	*	0	0	1	0	1018.7
D	8	8	15	10	*	2	5	0	*	*	0	1019.7
YR	109	121	135	114	*	69	30	69	*	13	0	1016.6

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 102 in June 1934 and earlier (City Office); lowest temperature 7 in February 1899; maximum monthly precipitation 25.11 in October 1937; maximum precipitation in 24 hours 14.01 in April 1927; maximum monthly snowfall 8.2 in February 1895; maximum snowfall in 24 hours 8.2 in February 1895.

(a) Length of record, years, through the current year unless otherwise noted, based on January data.
(b) 70° and above at Alaskan stations.
* Less than one half.
T Trace.

NORMALS - Based on record for the 1941-1970 period.
DATE OF AN EXTREME - The most recent in cases of multiple occurrence.
PREVAILING WIND DIRECTION - Record through 1963.
WIND DIRECTION - Numerals indicate tens of degrees clockwise from true north. 00 indicates calm.
FASTEST MILE WIND - Speed is fastest observed 1-minute value when the direction is in tens of degrees.

STATION: New Orleans, Louisiana
POSITION: 29°59'N 90° 15' W
ELEVATION: 4 feet NGVD

SOURCE: "Local Climatological Data 1979"
NOAA National Climatic Center
Asheville, NC

The average annual rainfall for the period of record from 1941 through 1970 is about 61 inches for the area. The greatest rainfall occurs from June through September with an average of 6.0 inches per month. Afternoon convective showers and thunderstorms of short duration frequently occur during this period. The driest month is October with an average of 2.8 inches. Occasional tropical storms or hurricanes may significantly increase the rainfall amount in any month between June and November, inclusive.

The general circulation of air over the area is dominated by the western extension of the Bermuda High. The circulation is also influenced by high pressure systems over the North American continent. In the study area, tropical storms and hurricanes can produce winds of extremely high velocities. Tropical depressions are cyclonic circulations with maximum sustained winds up to 38 mph. Tropical storms are cyclonic circulations with sustained winds from 38 to 73 mph.

Hurricanes are cyclonic circulations with winds that exceed 73 mph. The principal season for hurricanes in the North Atlantic region is from June through November and the preponderance of hurricanes occurs in August and September. About half of all occurrences of hurricanes in the project area have occurred in September. Historically, tropical cyclones have hit the area with a mean occurrence of about one every three years.

The most destructive storm of record on the Louisiana coast and one of the great hurricanes of this century, "Betsy," developed in the eastern Atlantic on August 28, 1965. The eye of the storm entered the Louisiana coast at Grand Isle between 9 and 10 pm on September 9th. Winds at Grand Isle were reported at 105 mph with gusts to 160 mph. Storm tides swept over the island and practically all the buildings were either swept away or severely damaged by the onrushing surge and waves. The maximum stage at Grand Isle resulting from Hurricane "Betsy" was 8.8 feet NGVD. Damages were estimated at over $2 billion, and deaths in Louisiana were listed at 81 persons. The path of Hurricane "Betsy" can be seen on Plate 14. One of the most intense and destructive hurricanes ever recorded, "Camille," Plate 15, struck the coast of Mississippi just east of the Louisiana state line on August 17, 1969, causing widespread destruction and loss of life. Shortly before midnight on the 17th, "Camille" went inland in the Waveland - Bay St. Louis area with winds estimated at 160 mph and estimated gusts up to 200 mph. A reliable highwater mark of 22.6 feet NGVD was found in Pass Christian, Mississippi. Some of the maximum stages resulting from Hurricane "Camille" were: Chalmette, 11.3 feet NGVD; Boothville, 14.6 feet NGVD and Inner Harbor Navigation Canal at Florida Avenue 9.8 feet NGVD. Monetary damages as a result of "Camille" were in excess of $1 billion along the Gulf Coast; in Louisiana nine lives were lost.

The National Weather Service operates a complete meteorological station in Jefferson Parish at New Orleans International Airport; it has a

35 year period of record. In nearby Orleans Parish, the Weather Service operates the station with the longest period of record in the area. It is located in Audubon Park and has a 107 year period of record. Rainfall measurements are also usually taken at the many pumping stations in the parish and are available on request from JeffersonParish. The periods of record at these parish stations vary. The highest 24-hour rainfall measured at the Audubon Station was 14.0 inches on April 15-16, 1927. Other large rainfall amounts have occurred over the years. Point rainfall analyses for various frequencies and durations are available in NOAA Technical Paper No. 40.

Continuous records of stages are available at several locations in and near Jefferson Parish. On the west bank of Jefferson Parish, several continuous gages are operating. These are: Bayou Barataria at Barataria since January 1950, Bayou Barataria at Lafitte since October 1955, and Bayou Rigaud at Grand Isle since August 1947. A recording hurricane gage is also located on Grand Isle at the mayor's office. A wire-weight type gage is located in the Intracoastal Waterway at the Harvey Lock and is read daily, usually at 8 a.m. Records for this gage are available since January, 1925. In the Mississippi River the continuous gage located nearest Jefferson Parish is the Carrollton gage, located in Orleans Parish at river mile 102.8; it has been in operation since January 1872. All of these gage records are available in Stages and Discharges of the Mississippi River and Tributaries. In addition, gage information and still-water elevations for hurricanes of relatively recent history affecting the area are available in various other publications of the U. S. Army Corps of Engineers and other agencies.

Climatic hazards which pose the most serious flooding threat to the west bank of Jefferson Parish are hurricane surge and the simultaneous occurrence of rainfall and high tides. Intense hurricanes can produce a storm surge of sufficient height to overtop the existing protective embankments and flood the heavily populated developed areas. The 100-year and 200-year overflow limits are shown on Plate 16.

Drainage problems are exacerbated when rainfall is accompanied by high tides. During May, 1978 and April, 1980, short duration - large accumulation rainfalls occurred in this area. These rainfalls were associated with weather fronts whose southerly winds pushed high tides against the exposed levees of the west bank. Pump stations which discharge into the marsh were forced to operate against outside stages higher than optimum, thus further reducing the already overtaxed pumping capacity of these stations. During the rainstorm of May 3, 1978, the stage at Barataria on Bayou Barataria was 2.3 feet NGVD because of strong onshore winds which accompanied the rain storm. Nearby, in the city of Algiers the measured rainfall on this day 9.8 inches. On April 13, 1980, the rainfall measured in Algiers was 9.7 inches and the accompanying stage at Barataria was 3.8 feet NGVD. Note that this stage is only 0.05 feet less than the peak hurricane stage which occurred during the passage of hurricane "Babe" in 1977. Babe was a hurricane of

minimal strength. The severity of flooding under these conditions emphasizes the potential for dangerous flooding during the passage of a strong hurricane on a similar or more critical path for the project area.

4.1.3. Soils and Drainage.

To protect its populated areas from storm surges and high water Jefferson Parish and surrounding communities constructed a system of levees. While preventing high waters from intruding, these levees also preclude any rainwaters which fall within their perimeter from draining onto the adjacent lower lands and lakes. As a solution to this problem leveed areas are webbed with drainage outfall canals which terminate at a pump station. These pumps remove flood waters ponded inside the leveed areas.

The drainage system of the west bank of Jefferson Parish is very complex, having evolved one unit at a time. It is now a myriad of small pump stations each draining a small area separated from others by road embankments, railroad tracks, and small levees. Historically, this system has proven inadequate in capacity and prone to breakdown. Jefferson Parish currently has plans to improve the system by enlarging canals, collection ditches and pumping stations.

For areas added to the protected side of the levees by some of the alternative alinements, the additional pumping capacity required was calculated at the rate of 0.2 cfs per acre in order to match the pumping rates contained in the master drainage plan for Jefferson Parish. The size of gates to maintain the exchange of tidal prism was based on the existing tide range at the nearest permanent gaging station and the area of wetlands closed off by the levee.

The project area contains 13 soils series which are described below and illustrated in Plate 17 (U.S. Department of Agriculture, 1978).

- Allemands muck is a poorly drained, organic soil that has been protected from flooding and drained. Surface elevations, which are some of the lowest in the survey area, have been lowered to below sea level since initial drainage.

- Allemands peat is a very poorly drained, unprotected and undrained organic soil at low elevations. The water level is near or a few inches above the soil surface most of the year. Surface runoff is very slow to none. Permeability is rapid in the organic layers and very slow in the mineral layers. Available water capacity is high.

- Allemands Variant muck is a very poorly drained soil at low elevations. The water level is above the soil surface most of the year. There is little or no surface runoff and permeability is very slow.

- Barbary soils is a very poorly drained soil at low elevations between the natural levee of the streams and marshes. The water level is at or above the surface most of the year. Surface runoff is almost nonexistent and permeability is very slow.

- Barbary Variant clay (drained) is a poorly drained, mineral soil that has been protected from flooding. Surface elevations have been lowered to below sea level since initial drainage. The water table is regulated by drainage pumps, but is near the surface for short periods following heavy rains; surface runoff is slow.

- Commerce silt is a level, somewhat poorly drained soil at high elevations on natural levees of the Mississippi River and its distributaries. This soil occupies some of the highest elevations in the project area. Surface water runoff occurs at a slow-rate. The seasonally high water table fluctuates between a depth of 1.5 and 4 feet.

- Commerce silty clay loam is a level, somewhat poorly drained soil on natural levees of the Mississippi River and its distributaries. Surface water runoff occurs at a slow rate. The seasonally high water table fluctuates between a depth of 1.5 and 4 feet.

- Ijam Varient clay is a level, very poorly drained soil adjacent to canals and waterways. The water table is regulated by drainage pumps. Surface water runoff occurs at a slow rate.

- Kenner muck is a very poorly drained soil which occurs at or below sea level. The water level is above the soil surface during most of the year. Permeability is rapid in the organic layers and very slow in the mineral layers. Surface water runoff is very slow.

- Sharkey clay is a level, poorly drained clay soil on the low natural levees of the Mississippi River and its distributaries. Surface water runoff occurs at a slow rate. The seasonally high water table fluctuates between a depth of one and two feet during rainy seasons.

- Sharkey silty clay loam is a firm soil on the low natural levees of the Mississippi River and its distributaries. The water table is within 15 inches of the surface during rainy seasons. Permeability and surface water runoff are very slow.

- Sharkey Variant clay is a level, poorly drained soil at low elevations adjacent to the higher natural levees of the Mississippi River and its distributaries. Surface water runoff occurs at a slow rate. The seasonally high water table fluctuates between one and two feet during rainy seasons.

- Vacherie complex (gently undulating) is a somewhat poorly drained soil on the natural levees at high local elevations associated with old levee breaks or crevasses. The water table is 20 to 30 inches below the surface during rainy periods of the year. Permeability and surface water runoff are very slow.

All of the soil types shown on Plate 17 are similar to most other soils in the Jefferson Parish area, in that they will settle upon loading, will shrink and oxidize upon dewatering, have low shear strengths, and therefore, settlement sensitive structures have to be pile supported.

4.1.4 Major Vegetation Communities.

For discussions concerning ecological characteristics, arbitrary boundaries were established to facilitate quantitative evaluations. These boundaries consist of Louisiana Highway 45 to the east, Lapalco Boulevard to the north, and Alternative A's alinement to the west and south.

The ESA encompasses approximately 4,477 acres of the upper drainage basin of the Barataria Bay Estuary. Within this area, approximately 2,729 acres or 61.0 percent of the total is considered suitable to support natural ecosystems as a primary function, while the remaining areas, approximately 1,748 acres, consist of developed areas and/or disturbed sites (Westwego Sanitary Landfill). Within the natural ecosystems of the ESA, a great diversity of vegetative communities exists and is dependent on regional surface elevations, water regimes and soil types.

Three major vegetative communities were identified in the ESA through use of recent infrared photography and groundtruth surveys. These communities included swamp, fresh marsh, and bottomland hardwoods. Swamp is the predominant community comprising approximately 1,748 acres. The swamp is typified by an overstory of cypress-tupelogum.

Bottomland hardwoods is the second most predominant community, consisting of approximately 368 acres. This community is restricted to the slightly higher elevations of the old Mississippi deltaic plain deposits which occur along the overbank areas parallel to Bayou des Familles in the southeastern portion of the project area. Although generally dry, these forests are wet for a portion of the year and descend into cypress-tupelogum swamps as elevations decrease west of the ridge. Major overstory species within this include American elm, live oak, overcup oak, Drummond red maple, southern magnolia, sweetgum, and water oak.

The remaining major vegetative community within the ESA is fresh marsh, accounting for a total of 322 acres. Isolated pockets of marsh in the northwest and southwest areas of the ESA were consistently found in association with the swamp boundaries. Three predominant marsh species are found: cattail, cutgrass, and bulltongue.

4.1.5. Zoological Communities.

The area is presently affected by urban runoff and municipal wastewater discharges, as well as the continued encroachment of development and natural habitat alterations. The three major vegetative communities support moderate populations of wildlife. Primary wildlife species directly observed or expected to exist in this area include furbearers, various small mammals, a rich diversity of birds and common reptiles and amphibians.

4.1.6 Archeological/Cultural Resources.

Surveys within the project area included four high probability locations for archeological/cultural site concentrations: Bayou des Familles and the des Familles levee ridge, levee ridge systems along the natural bayous, the levee ridge along the east bank of Bayou Segnette and the wetland/nonwetland interface (Westwego area). Of these four high probability locations, archeological site concentrations were found parallel to the natural levee ridge in the vicinity of Bayou des Familles and the des Familles levee ridge. This linear distribution of sites runs for a distance of approximately two miles and extends north of the National Park Service property line a distance of approximately 1,320 yards (Beavers, 1982). No sites of National Register significance or those eligible for inclusion on the National Register of Historic Places were recorded as being located within the general project area (DeBlieux, 1982).

Recreational opportunities on the West Bank consist of water oriented sports such as fishing and boating in the sparsely populated southern extreme of the parish. Three major recreational areas of significance on the west bank are the Lake Cataouatche-Salvador Complex which includes the Salvador Wildlife Management Area, the Jean Lafitte National Historical Park and the Bayou Segnette State Park. The

Lake Cataouatche-Salvador Complex has 54,000 acres of lake area and 28,469 acres in the Wildlife Management Area for a combined total of 82,469 acres. Access to this area is provided primarily by Bayous Segnette and Barataria in the Westwego and Barataria areas, respectively, and Lanaux Canal in the vicinity of the Jefferson - St. Charles Parish line along U.S. Highway 90.

The Jean Lafitte National Historical Park (Plate 18), located primarily west of Louisiana Highway 45 and east of Lake Salvador, occupies a core area of approximately 8,600 acres. This area includes four major management zones: the natural zone, the cultural resources zone, the park development zone, and the other use zone. The park's authorizing legislation designated an 11,400 acre park protection zone north of the core area which was intended to help preserve the core area's natural values.

Bayou Segnette State Park is a 600-acre facility located just west of the project area, adjacent to Bayou Segnette and along the West Bank Expressway. Design studies for the park have been completed and infrastructure improvements are scheduled to begin by the end of 1983. When completed, the park will contain such amenities as a recreational complex, picnic area, cabins, boat launch, trailer camp and canoe trails. The park's development is scheduled to be completed by the summer of 1985 at a cost of $9.0 million.

4.2 Significant Resources.

4.2.1 Natural.

4.2.1.1 Marshes.

Within the defined Ecologcal Study Area (ESA), approximately 322 acres of fresh marsh exist in random locations adjacent to swamps. The more elevated natural ridges support typical bottomland hardwoods which merge into swamps as elevations decline. Swamps merge into fresh marshes representing additional slight drops in elevations. These fresh marshes merge into intermediate or brackish marshes as dictated by salinity. The fresh marsh acreage represents 4,477 acres of the ESA. It encompasses only a small fringe of the fresh to intermediate marsh habitats that predominate in the area immediately west of the project.

Fresh marsh typically supports the greatest diversity of plant species and contains many preferred foods for wildlife (U. S. Army Corps of Engineers, 1982). Estimates of net primary production for fresh marshes in Louisiana based on the measured productivity of selected plants is 2,200 $g/m^2/yr$ (Gosselink et al., 1977; Boyd, 1969). Bahr and Hebrard (1976) have estimated the aboveground biomass for fresh marsh in the Barataria Basin to be approximately 8,000 lb/acre.

Major coverage of cutgrass, cattail, and bulltongue, is represented at various marsh sites, however, bulltongue is the overall predominant species in the area. Other marsh species occupying the areas include alligatorweed, American three square, baccharis, common rush, great bulrush, and wax myrtle. Refer to Appendix for a checklist of marsh vegetation observed or expected to occur in the ESA.

4.2.1.2 Swamp.

Swamp is the major vegetative habitat within the Ecological Study Area (ESA). Approximately 1,748 acres of swamp exist within this area.

Swamp is typically located inland from fresh marsh and occupies the lowest and most recently formed areas of alluvial soils. These areas remain inundated for extensive periods throughout the year and are important as wildlife habitat. Water-level variability in the swamp of the ESA is a combined function of local rainfall, seasonal gulf cycles, which have backwater effects, and tidal influence.

The swamp is dominated by an overstory of bald cypress and tupelogum with localized densities determined by drainage and elevation. The extent and duration of flooding generally determines the species composition in such areas (Zeringue, 1980). Dominant understory vegetation consists of black willow, Drummond red maple, buttonbush, palmetto, and wax myrtle. A checklist of species observed or expected to occur in the swamp within the ESA is appended.

According to Day et al. (1979), productivity in cypress-tupelo swamp is directly related to the degree of water flow through the community. Both frequency and intensity of flooding are important, with the highest productivity occuring at sites characterized by seasonal flooding. Productivity is lower in areas with less water flow and in places with very strong flow. Seasonally flooded cypress-tupelo swamps in the Lac Des Allemands area were shown to have net primary productivity rates of 1,220 $g/m^2/yr$ as compared to stagnant (non-flowing) swamp rates of 624 $g/m^2/yr$ (Conner, and Day, 1976). Because of alteration in natural drainage patterns in the Ecological Study Area (ESA) over the past several years (oil and gas canals, dredged material banks and urban encroachment), the remaining swamps do not experience a natural, unrestricted water-exchange. The areas generally exhibit low flushing. The species diversity and overstory observed in the area evidence this condition, as cypress and tupelogum only germinate under nonflooded conditions (Day et al., 1979), and understory composition is dictated by flooding periodicity.

Through the network of natural and artificial waterways traversing the ESA, the swamps maintain a direct hydrologic link to the lower Barataria Basin. Day (1977) emphasized the general importance of swamp-estuary couplings in the Barataria Basin with regard to nutrient contributions, hydrologic stability and estuarine nursery habitat. Large quantities

of nitrogen, phosphorus, and carbon are transported from upper Barataria Basin swamps to the lower estuarine zone. However, in the ESA, the significance of beneficial nutrient contribution to down gradient estuaries is questionable due to the restricted water exchange and eutrophic conditions which dominate the waterways.

The Westwego Sanitary Landfill is located in the north central portion of the ESA and is situated in the middle of a swamp. The landfill is estimated to cover approximately 61 acres and contributes to the degradation of the surrounding habitat.

4.2.1.3 Bottomland Hardwoods.

Bottomland hardwoods are restricted to one relatively small region in the southeastern area of the Ecological Study Area (ESA). Approximately 368 acres are included in one continuous area along a portion of the natural ridge paralleling Bayou des Familles.

Portions of this habitat are periodically flooded while other areas remain relatively dry throughout the year. Thus, overstory and understory are variable throughout the area, reflecting effects of elevation and hydrologic influences. The drier areas (closest to Louisiana Highway 45) have dominant overstory including live oak, overcup oak, southern magnolia, and hackberry. As slight decreases in elevation occur away from the ridge, more water-tolerant species predominate including tupelogum, American elm, sweet gum, and red maple. A listing of vegetation observed or expected to occur in this habitat type is appended. There is no distinct point at which this community becomes a true swamp.

4.2.1.4 Open Water.

Within the Ecological Study Area (ESA) there are approximately 291 acres of open-water consisting principally of canals and bayous. While adjacent waterways exhibit tidal influence and resulting seasonal salinity variabilities (Garrison, 1982), the immediate project waterways are fresh water.

Normal flow rates observed in the open-water were less than one foot per second. Flows in most waterways are not apparent.

As a result of eutrophic conditions and sluggish water movements, aquatic vegetation thrives in most of the major waterways and associated canals throughout the area. Water hyacinths and duckweeds are the predominant floating aquatic vegetation in all project waterways; surface coverage approached 100 percent in many locations from midsummer through late fall.

A listing of aquatic vegetation observed or expected to occur within the ESA is appended.

4.2.1.5 Water Quality Setting

4.2.1.5.1 Groundwater.

Groundwater within the coastal parishes of southern Louisiana is limited in its potential use because of high chloride concentrations. No known potable groundwater sources exist within the general area which could be impacted by the proposed levee construction. Public drinking water supplies for the Greater New Orleans Metropolitan Area are taken from the Mississippi River. Three major aquifers comprise available groundwater sources within Jefferson Parish. These include: the Grammercy aquifer, 200-foot sands; the Norco aquifer, 400-foot sands; and the Gonzales-to-New Orleans aquifer, 700 foot sands (Dial 1982). Within Jefferson Parish, water from these aquifers contain chloride concentrations in excess of 200 milligrams per liter (mg/l). In 1980, groundwater use in Jefferson Parish totaled about 9.36 million gallons per day which was primarily used for fossil fueled power generation and industrial purposes (Walter, 1982).

4.2.1.5.2 Surface Waters.

Surface waters and wetlands that would be affected by the proposed project comprise the Bayou Segnette Drainage Area. This area is located in the northeastern portion of Stream Segment 03 of the Barataria Basin (Plate 19). The primary waterway within the area is Bayou Segnette which originates at the Bayou Segnette Pump Station immediately south of Westwego. Bayou Segnette extends generally southward from the pumping station, then divides into Bayou Bardeaux and the Bayou Segnette Waterway. Bayou Bardeaux flows immediately into Lake Salvador, while the Bayou Segnette Waterway extends farther southward to the intersection of the Gulf Intracoastal Waterway and Bayou Barataria. Other waterways of significance in the impact area include Kenta Canal, Millaudon Canal, Bayou Boeuf, and Location Canal. Numerous other small waterways within the wetlands complicate the flow regime of this relatively small drainage area (Plate 20).

The influence of high incoming tides and the mild slope gradients of Bayou Segnette and Kenta Canal, the area's principal waterways, cause extremely sluggish flow through the entire drainage area. Except during periods of heavy stormwater pumping from the developed areas to the north and east, relatively slow downstream water movement occurs. Reverse flow can occur during periods of low headwater discharge and high incoming tides.

4.2.1.5.3 Water Quality Standards and Criteria.

Surface waters of Stream Segment 03 of the Barataria Basin, including the Bayou Segnette Drainage Area, have been designated as suitable for "primary contact recreation" and "propagation of fish and wildlife".

Numerical water quality standards applicable to the surface waters within Stream Segment 03 are presented in Table 4.2. The listed standards address chloride (Cl), sulfate (SO_4), dissolved oxygen (DO), and total dissolved solids (TDS) concentrations, pH, water temperature, and fecal bacteria density. No numerical standards beyond those listed in Table 4.2 have been implemented for Stream Segment 03 by the State of Louisiana.

TABLE 4.2

LOUISIANA WATER QUALITY STANDARDS
SEGMENT NO. 03 - BARATARIA BASIN

Cl (mg/l)	SO_4 (mg/l)	DO (mg/l)	pH Range su	BAC STD	Temp °C	TDS (mg/l)
600	100	5.0	6.0 - 8.5	1*	32	1320

*"Based on a minimum of 5 samples taken over not more than a 30-day period, the fecal coliform content shall not exceed a log mean of 200/100 mL nor shall more than 10% of the total samples during any 30-day period exceed 400/100 ml."

The Environmental Protection Agency (EPA) has developed numerical criteria based principally upon chronic and acute toxicity of various pollutants to aquatic organisms. Unlike the state standards, the EPA criteria are not regulatory, but may be adopted by states where no state standards exist. Louisiana has not presently adopted any of the suggested EPA criteria. Selected EPA criteria are used to supplement applicable state standards for the water quality evaluation. Table 4.3 summarizes selected EPA Freshwater criteria. The EPA criteria specify pollutant concentrations which, if not exceeded, should protect most, but not necessarily all, aquatic life. The combination of the 24-hour average and maximum criteria values is designed to adequately protect aquatic life from acute and chronic toxicity. A two-number criterion is intended to describe the highest average ambient water concentration that will produce a water quality generally suited to maintaining aquatic life, while restricting the extent and duration of excursions over the average to levels that will not cause harm. Thus a two-number criterion is less restrictive than a one-number criterion would have to be in order to provide the same degree of protection. The maximum criterion value, which is derived f acute toxicity data, is intended to prevent significant risk of adverse impact to organisms exposed to concentrations above the 24-hour average. The trace metals criteria are applicable to the concentration of total recoverable metal in a sample. The Freshwater criteria for 24-hour average concentrations of cadmium and lead, and for instantaneous maximum cadmium, copper, lead and zinc concentrations vary directly with water hardness. The selected

chronic toxicity criteria are concentrations that have been shown to produce a chronic response in a particular freshwater organism. For species that are more sensitive than those tested, chronic effects would occur at lower concentrations.

TABLE 4.3
EPA QUALITY CRITERIA FOR FRESHWATER 1/

Parameter	Chronic Toxicity	Acute Toxicity	24-Hour Average	Instantaneous Maximum	Eutrophication
Un-ionized Ammonia, ug/l-NH_3	20	-	-	-	-
Total Phosphorus, ug/l-P	-	-	-	-	100
Beryllium, ug/l	5.3	130	-	-	-
Cyanide, ug/l	-	-	3.5	52	-
Arsenic, ug/l	-	-	-	440	-
Cadmium, ug/l	-	-	2/	2/	-
Copper, ug/l	-	-	5.6	3/	-
Iron, ug/l	1000	-	-	-	-
Lead, ug/l	-	-	4/	4/	-
Mercury, ug/l	-	-	0.2	4.1	-
Zinc, ug/l	-	-	47	5/	-
Aldrin, ng/l	-	-	-	3000	-
Chlordane, ng/l	-	-	4.3	2400	-
DDT, ng/l	-	-	1.0	1100	-
Dieldrin, ng/l	-	-	1.9	2500	-
Endrin, ng/l	-	-	2.3	180	-
Heptachlor, ng/l	-	-	3.8	520	-
Lindane, ng/l	-	-	80	2000	-
Malathion, ng/l	100	-	-	-	-
Parathion, ng/l	40	-	-	-	-
PCBs, ng/l	-	-	1.4	2000	-
Toxaphene, ng/l	-	-	1.3	1600	-

1/ EPA Quality Criteria for Water (1976) and Criteria for Section 307(a)(1) Toxic Pollutants, (1980).

2/ Cadmium: 24-h average value = Exp [1.05 ln (hardness) -8.52] ug/l
Maximum value = Exp [1.05 ln (hardness) -3.37] ug/l

3/ Copper: Maximum value = Exp [0.94 ln (hardness) -1.23] ug/l

4/ Lead: 24-h average value = Exp [2.35 ln (hardness) -9.48] ug/l
Maximum value = Exp [1.22 ln (hardness) -0.47] ug/l

5/ Zinc: Maximum value = Exp [0.83 ln (hardness) +1.95] ug/l

ug/l = micrograms per liter (parts per billion)

ng/l = nanograms per liter (parts per trillion)

4.2.1.5.4 Existing Water Quality.

Stream Segment 03 of the Barataria Basin, including the Bayou Segnette Drainage area, is classified as "effluent limited". An effluent limited stream segment is defined as any segment where water quality is meeting and will continue to meet applicable water quality standards. Stream segments where water quality will meet applicable standards after application of effluent limitations required by the Federal Clean Water Act are also classified as effluent limited. With the exception of direct rainfall, essentially all waters which flow through the Bayou Segnette Drainage Area consist of pumped stormwater runoff and wastewater treatment plant effluent. The Water Quality Management Plan for the Barataria Basin suggests that Bayou Segnette and the Millaudon Canal represent exceptions to the generally adequate water quality of Segment 03. Periodic contraventions of applicable dissolved oxygen and fecal bacteria state standards have been noted. Additionally, high 5-day biochemical oxygen demand (BOD_5) and nutrient levels, oil production related brine discharges, and saltwater intrusion have been cited as problems in the area. Apparently, sluggish water movement and the effects of treated wastewater effluent and stormwater discharges are compounding factors that result in poor water quality in these areas. Cessation of effluent discharges from the Marrero Oxidation Pond in May, 1983 should result in improved water quality in the Millaudon Canal.

A water quality survey of the Bayou Segnette Drainage Area was conducted by the U. S. Geological Survey (USGS) in cooperation with the National Park Service. Six locations were sampled monthly from April, 1981 through March, 1982. The locations of these sampling stations are shown on Plate 21; summary statistics for sampled constituents are appended.

An additional water sampling and analysis program was conducted for the Bayou Segnette Drainage Area from February through July 1982. The selection of sampling locations and sample collection was conducted by C-K Associates, Inc., Baton Rouge, Louisiana under contract with Jefferson Parish. Laboratory analyses were performed by the Jefferson Parish Water Quality Laboratory. Samples were collected monthly at eight locations within the Bayou Segnette Drainage Area. These sampling locations are also shown on Plate 21; results of the analyses are appended.

4.2.1.5.5 General Inorganics, Temperature, and pH.

Chloride measurements by the USGS suggest that saltwater intrusion might be significant in Bayou Segnette during periods of low headwater discharge and high incoming tides. Chloride measurements were made at three locations on Bayou Segnette during the 12-month period from April, 1981 through March, 1982. Salinity, computed from chloride

concentrations, at the northernmost sampling location, 2.9 miles south of Westwego (station A), averaged 1.0 parts per thousand (ppt) and ranged from 0.4 to 2.2 ppt. Salinity at the Bayou Segnette sampling station located about 4.6 miles south of Westwego (station C) ranged from 0.8 to 3.5 ppt and averaged about 2.1 ppt. At the southernmost Bayou Segnette sampling location (station E), about 9.7 miles south of Westwego, salinity averaged about 3.0 ppt and ranged from 1.4 to 5.3 ppt. Sampling locations in the Millaudon and Kenta Canals, in the interior of the drainage area (stations B and D), had comparatively lower mean salinities of 0.6 and 1.4 ppt, respectively, during the 12-month period. Generally, the highest chloride concentrations, at each sampling location, occurred from October through December - the historically low rainfall and high Gulf tides period for the area. The USGS data set only covers a one year period; however, the data suggest that Bayou Segnette should be considered oligohaline with an annual salinity range of about 0.5 to 5 ppt.

TABLE 4.4

PERCENT OF SAMPLES THAT EXCEEDED
LOUISIANA WATER QUALITY STANDARDS
1981 - 1982

STATION	CHLORIDE	SULFATE	DISSOLVED SOLIDS
Bayou Segnette 2.9 Miles S. of Westwego	42%	92%	42%
Millaudon Canal near Westwego	8%	25%	8%
Bayou Segnette 4.6 Miles S. of Westwego	92%	100%	92%
Kenta Canal N.W. of Crown Point	50%	25%	50%
Bayou Segnette near Barataria	100%	100%	100%
Kenta Canal W. of Crown Point	33%	25%	33%

Source: Garrison, 1982

The data indicate that headwater discharges into Bayou Segnette were not sufficient to prevent significant saltwater intrusion during a portion of the sampling period. The comparatively low mean salinities in the canals of the interior of the drainage area imply that saltwater intrusion into those areas was not significant during the sampling period.

Chloride, sulfate, and total dissolved solids concentrations which exceeded the state standards were measured at each of the USGS sampling locations. Table 4.4 presents the percentages of samples that exceeded applicable standards during the 12-month survey.

Total dissolved solids concentrations which were in excess of the state standard (1320 mg/l) were only observed when chloride concentrations also exceeded the applicable standard (600 mg/l). However, some sulfate concentrations greater than the state standard (100 mg/l) were observed when both chloride and total dissolved solids concentrations were within acceptable limits. It appears that the primary cause of the observed high chloride and total dissolved solids concentrations was saltwater intrusion. However, some measured high sulfate concentrations, particularly near headwater inflows in Bayou Segnette and the Millaudon Canal, do not appear to be related to saltwater intrusion. Many of the high sulfate concentrations most likely resulted from pumped urban stormwater runoff and treated wastewater effluents, and probably represent true violations of the state standard.

Measured cyanide concentrations exceeded this EPA criterion for 24-hour average concentrations (3.5 ug/l) in all samples collected at the eight Jefferson Parish sampling sites. About 79% of the measured cyanide concentrations exceeded the EPA criterion for instantaneous maximum concentrations (52 ug/l). Overall, observed cyanide concentrations averaged about 370 ug/l and ranged from 6 to 3,780 ug/l. Data for sampling site 3, at the Millaudon Canal, yielded the highest average cyanide concentrations at 795 ug/l.

The state standard for maximum surface water temperature in the Bayou Segnette drainage area is 32 degrees Celsius (90°F). This value was exceeded at all of the USGS sampling sites, except Millaudon Canal (station B), on July 20, 1981. The observed high surface water temperatures apparently were the result of natural phenomena and not heated discharges.

The pH range considered to be acceptable for the surface waters and wetlands of the Bayou Segnette Drainage area is 6.0 to 8.5 standard units (su). A pH of 5.0 su was measured in the Kenta Canal west of Crown Point (station F) on March 4, 1982. This was the only measured pH value which was not within the optimal range during the 12-month USGS sampling program.

4.2.1.5.6 Dissolved Oxygen and Biochemical Oxygen Demand.

The standard for minimum dissolved oxygen (DO) concentrations in waters of the Bayou Segnette Drainage Area is 5.0 mg/l. Data from the USGS sampling program indicate that concentrations less than 5.0 mg/l have occurred frequently at some locations. Measured DO concentrations varied from zero to 13.1 mg/l during the USGS sampling. Mean DO concentrations ranged widely from 0.6 (station B) to 8.0 mg/l (station C). By far the poorest record of DO observations was obtained for the Millaudon Canal sampling site (station B). The highest recorded DO concentration for this sampling location was 2.3 mg/l. Only three concentrations were measured at the site that were 1.0 mg/l or greater during the 12-month USGS sampling program. Table 4.5 lists mean DO concentrations and the percentage of observations which were less than the 5.0 mg/l state standard for each of the six sampling sites.

TABLE 4.5

BAYOU SEGNETTE DRAINAGE AREA
MEAN DO CONCENTRATIONS AND PERCENT OF SAMPLES IN WHICH
DO WAS LESS THAN 5.0 mg/l

Station	Mean DO mg/l	% of Observations less than 5.0 mg/l standard
Bayou Segnette 2.9 Miles South of Westwego	6.0	33
Millaudon Canal	0.6	100
Bayou Segnette 4.6 Miles South of Westwego	8.0	17
Kenta Canal N.W. of Crown Point	5.7	45
Bayou Segnette near Barataria	7.5	17
Kenta Canal West of Crown Point	5.3	36

Source: Garrison, 1982

Relatively high 5-day biochemical oxygen demands (BOD_5) were observed at each of the six USGS sampling locations. In many instances measured BOD_5 concentrations exceeded DO

concentrations. Five of twelve samples from Bayou Segnette 2.9 miles south of Westwego had BOD_5 concentrations greater than 5.0 mg/l, and all samples from the Millaudon Canal had BOD_5 values that exceeded the measured DO. The average BOD_5 in Millaudon Canal was about 7.0 mg/l. Generally, the highest BOD_5 and lowest DO concentrations were measured in the northern portion of the drainage area where wastewater discharges influence water quality.

4.2.1.5.7 Fecal Coliform Bacteria.

The potential presence of pathogenic bacteria, viruses, protozoa, and possibly fungi in a water sample is indicated by the presence of fecal coliform bacteria. Thus, the density of fecal coliforms present in a sample is indicative of the degree of health risk associated with various uses of the water. The most stringent water use designation for the Bayou Segnette Drainage Area is for primary contact recreation. Primary contact recreation includes those activities where the raw water may be accidently ingested or where sensitive body organs, such as, eyes, ears, and nose, might be exposed directly to the water. The standard for this use designation requires that the logarithmic mean of a minimum of five observed fecal coliform densities not be greater than 200 colonies per 100 milliliters (ml) of water. Additionally, the 90th percentile of the distribution of observed fecal coliform densities should not exceed 400 colonies/100 ml. Further, the data must be obtained from samples collected over a period of one month or less for the standard to be applicable.

Fecal coliform densities were only determined on a monthly basis for six locations included in the USGS sampling program. Since samples were only collected monthly, the bacteria data are not directly comparable to the state standard. Over the 12-month period of the USGS sampling program, observed fecal coliform densities ranged widely from 2 colonies/100 ml to 65,000 colonies/100 ml. These data had a logarithmic mean of about 158 colonies/100 ml and a 90th percentile value of 4,040 colonies/100 ml. The Millaudon Canal (site B) consistently had much larger fecal coliform concentrations than were observed for the other sampling sites. All of the fecal coliform data for the Millaudon Canal show densities greater than 200 colonies/100 ml and about 90% of these data show concentrations greater than 400 colonies/100 ml. Bayou Segnette, 4.6 miles south of Westwego (site C), had relatively high fecal coliform densities that probably reflect the influence of Millaudon Canal discharges. High fecal coliform densities were also observed in the Kenta Canal west of Crown Point (site F) near the Gulf Intracoastal Waterway. Data summarizing observed fecal coliform densities for six USGS sampling locations are presented in Table 4.6.

4.2.1.5.8 Nutrients.

Elevated nitrogen and phosphorus concentrations in streams can stimulate the growth of aquatic vegetation to levels that can impede flow of water and hinder navigation. Wastewater effluents can carry large quantities of plant nutrients which can cause enrichment and accelerated aging of shallow waterbodies.

TABLE 4.6

BAYOU SEGNETTE DRAINAGE AREA
SUMMARY OF OBSERVED FECAL COLIFORM BACTERIA DENSITIES

Sampling Site	Log-Mean Density	Range	Weighted 90th Percentile	% of Samples with Densities >200	>400
	--- Colonies per 100 ml ---				
Bayou Segnette 2.9 Miles South of Westwego	45	5-600	572	18	9
Millaudon Canal	3,417	300-65,000	61,400	100	90
Bayou Segnette 4.6 Miles South of Westwego	176	40-7,700	5,552	33	25
Kenta Canal N.W. of Crown Point	42	2-190	188	0	0
Bayou Segnette near Barataria	45	6-400	382	17	0
Kenta Canal West of Crown Point	411	50-23,000	17,300	50	42

Data from the USGS and Jefferson Parish sampling programs indicate high nitrogen and phosphorus levels throughout the Bayou Segnette Drainage Area. Overall, measured total phosphorus concentrations averaged 1,267 ug/l-P and ranged from 40 to 8,400 ug/l-P for the six USGS sampling sites. Mean total phosphorus concentrations for the individual sampling locations ranged from 204 ug/l-P for Bayou Segnette near Barataria (site E) to 4,808 ug/l-P for the Millaudon Canal (site B).

Data from the Jefferson Parish water quality survey show generally similar mean total phosphorus concentrations. Overall, measured total phosphorus averaged 1,766 ug/l-P for the eight locations sampled during the Jefferson Parish study. Individual observations ranged widely from 198 to 6,700 ug/l-P. Sample means for the eight individual sampling locations ranged from 417 (site 6) to 3,432 ug/l-P (site 3).

The EPA recommends that total phosphorus not exceed 100 ug/l-P in waterways to prevent nuisance plant growth. All of the phosphorus data from the Jefferson Parish survey and about 94% of the USGS data show concentrations greater than 100 ug/l-P.

Only dissolved nitrogen forms were determined during the USGS sampling program. Overall, measured total dissolved nitrogen concentrations averaged 5,120 ug/l-N and ranged from 710 to 26,000 ug/l-N. Mean total dissolved nitrogen at the individual sampling sites ranged from 3,170 ug/l-N in Kenta Canal (sites D and F) to 10,930 ug/l-N in Millaudon Canal (site B). Measured total dissolved ammonia ranged from 50 to 17,000 ug/l-N and averaged 1,676 ug/l-N overall. Sample means for the individual sampling sites ranged from 182 ug/l-N at site D to 7,411 ug/l-N at site B. Concentrations of un-ionized ammonia (NH_3), which is highly toxic to most aquatic animals, were generally low at all sampling sites, except in the Millaudon Canal. At the Millaudon Canal sampling site, un-ionized ammonia concentrations averaged about 50 ug/l-NH_3 and ranged from 1 to 134 ug/l-NH_3. The EPA criterion for the protection of freshwater aquatic life is 20 ug/l-NH_3. About 58% of the data the Millaudon Canal site indicate concentrations greater than the 20 ug/l-NH_3 criterion.

Only total nitrogen forms were determined for the Jefferson Parish survey. Measured total nitrogen concentrations ranged from 80 to 14,020 ug/l-N and averaged 3,557 ug/l-N overall. Sample means for individual sampling sites ranged from 1,509 ug/l-N at site 8 to 7,508 ug/l-N at site 3. Measured total ammonia concentrations ranged from about zero to 9,400 ug/l-N and averaged 1,316 ug/l-N overall. Sample means for total ammonia ranged from 161 ug/l-N at site 7 to 3,876 ug/l-N for site 5.

Generally the USGS and Jefferson Parish data show comparable mean nitrogen and phosphorus concentrations. Both sets of data show that the highest nutrient levels were measured in surface waters located in the northern portion of the drainage area nearest wastewater discharges. However, the data also indicate that all of the sampled waterways were highly nutrient enriched during the two sampling periods.

4.2.1.5.9 Organics, Including Pesticides and Polychlorinated Biphenols (PCBs).

Analyses were performed for oil and grease, phenols, PCBs, and twelve pesticides for the six-month Jefferson Parish sampling program.

Observed oil and grease concentrations ranged from near zero to 57 mg/l during the six-month sampling period. The average oil and grease concentration for all samples was about 24 mg/l. Data for sampling site 4, at the junction of Bayou Boeuf and Millaudon Canal, show the highest average concentration at about 32 mg/l. There is no numerical

state standard for oil and grease concentrations; however, suggested permissable concentrations vary from 15 to 40 mg/l (USEPA, 1976).

Measured phenol concentrations for the eight sampling sites ranged from zero to 20 ug/l. Overall, phenol concentrations averaged about 3.4 ug/l. The highest average concentration for an individual sampling site, 8.2 ug/l, was computed from data for site 3 at the Millaudon Canal. The EPA suggests 1.0 ug/l as a maximum acceptable phenol concentration to avoid tainting of fish flesh (USEPA, 1980).

Results of analyses for twelve pesticides and PCBs show that each of the compounds, except toxaphene, was detected at least once during the six-month Jefferson Parish water quality survey. Pesticide analyses were performed for five organochlorine insecticides, four organophosphorus insecticides, and three common phenoxy herbicides. Dieldrin was the most frequently detected of the five organochlorine insecticides with about 46% of the samples containing measurable quantities. Dieldrin was detected at all sampling locations, except site 6. The highest observed dieldrin concentration occured at site 5 (Bayou Boeuf west of Millaudon Canal). Diazinon was the most frequently detected organophophorus insecticide with about 75% of the samples positive. Diazinon was detected at all eight sampling sites with the highest observed concentration occuring at site 3 at the Millaudon Canal. The phenoxy herbicides were the most frequently detected class of pesticide. About 96% of the collected samples contained measurable concentrations of the herbicide 2,4-D. Sampling site 3, Millaudon Canal, was most significant in terms of the magnitudes of observed concentrations. However, site 5, Bayou Boeuf west of Millaudon Canal, was most significant in terms of the relative frequency of detection of the thirteen compounds. Samples with concentrations of DDT (35%), malathion (17%), dieldrin (15%), parathion (8%), and PCBs (2%) exceeded the EPA 24-hour average of chronic exposure criteria. However, none of the samples had pesticide or PCBs measured at levels that exceeded the EPA criteria for instantaneous maximum concentrations.

4.2.1.5.10 Trace Metals.

The six-month Jefferson Parish water quality investigation included analyses for antimony, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc. Results of the analyses are shown in the appendix.

Hardness-dependent trace metals criteria were derived using the mean of surface water hardness values reported for the USGS water quality survey. Although some trace metals were measured at relatively high levels, few concentrations in excess of the acute criteria were noted. Measured levels of iron, mercury, beryllium, cadmium, copper, and zinc exceeded the EPA criteria for 24-hour average concentrations or for chronic exposure in some samples. However, only cadmium, copper, and zinc were consistently measured at levels in excess of the criteria for

24-hour average concentrations. Approximately 73% of the samples had cadmium concentrations greater than a derived 0.1 ug/l criterion. About 88% of the samples had copper concentrations greater than the EPA criterion (5.6 ug/l) and about 56% had concentrations greater than the 47 ug/l criterion for zinc.

4.2.1.6 Aquatic Organisms.

The majority of the aquatic environments (canals and bayous) within the Ecological Study Area (ESA) are influenced by urban runoff from nearby developed areas. Bayou Segnette and Millaudon Canal serve as initial effluent receiving canals for major sewage treatment plants and stormwater-runoff pumping facilities.

Phytoplankton analyses of various waterways associated with the project area were completed by the U. S. Geological Survey during four periods in 1981 and 1982. The station location closest to Ecological Study Area (ESA), Bayou Segnette, 4.6 miles south of Westwego, recorded the overall highest phytoplankton count of any station, 1,700,000 cells/ml. Ninety-eight percent of the organisms found were blue-green algae. According to Palmer (1962), the blue-green algae are most frequently encountered in natural waterways containing organic wastes, and constitute a "reliable index" for identification of polluted systems.

Benthic invertebrates at the upper Bayou Segnette Pumping Station, immediately below Millaudon Canal, were also examined (Garrison, 1982). The predominant organisms identified were tubificid worms, midge larvae, and snails. These organisms are considered to be tolerant to excessive amounts of decomposable organic wastes. A checklist of macroinvertebrates encountered in the project area is appended.

Based on field observations and site-specific references (Douglas, 1974; U. S. Army Corps of Engineers, 1975), the overall diversity of fisheries within the general project area is high. Freshwater fishes common to project waterways include catfishes, various sunfishes, bowfins, various gars, minnows, and shads. Menhaden, silversides, mullets, and other euryhaline species also frequent the area.

Although extensive fish-kills were observed within project area waterways during site investigations, sport fishing demand in the area remains high. No data is available, however, to indicate the success to effort ratio in the Ecological Study Area (ESA). A list of fishes observed or expected to occur within the ESA is appended.

4.2.1.7 Wildlife.

The ESA provides a variety of wildlife habitats for terrestrial and semi-aquatic animals including residents, transients, and migrants. The three vegetative habitats previously discussed (marsh, swamp, and natural levee forest) characterize the available habitats for wildlife.

Nutria are the most significant and abundant large herbivores in the fresh marsh. Numerous nutria "dens" dot the open marsh areas within the ESA, and commercial trapping is common. Deer also graze the fresh marsh; however, they are relatively sparse due to encroaching urbanization. Other predominant wildlife associated with marsh habitats include muskrats, swamp rabbits, mink, and various small rodents.

The swamp and natural levee forest support a greater density of herbivores, including deer, which may occur in densities of up to one per 30 acres; rabbits, up to one per three acres; squirrels up to one per four acres, as well as many rodents (U. S. Army Corps of Engineers, 1982).

Bahr and Hebrard (1976) reported a total of 216 species of birds occurring in the Barataria Basin, many of which would be expected to frequent the project area. Euryhaline species use the ESA as a nursery area. Within the period of field investigations (February-July, 1982), no substantial numbers of migratory waterfowl were noted within the area. More favorable habitats are located to the west of the area in the Cataouatche and Lake Salvador regions.

No nesting colonies of seabirds or wading birds are known to exist in the Ecological Study Area (ESA) (Portnoy, 1977).

ESA habitats are ideal for numerous reptile and amphibian species typical of freshwater and swamps. Observed species included snapping turtles, red-eared turtles, various watersnakes, cottonmouth moccasins, various frogs, and the American alligator.

A checklist of wildlife species oberved or expected to occur within the project area is appended.

4.2.1.8 Endangered Species.

Although the project area provides suitable habitat for, and lies within, the range of several endangered or threatened animal species (U. S. Fish and Wildlife, 1979), the only species sighted in the ESA was the American alligator listed as threatened by "similarity of appearance." Sightings of the bald eagle have been recorded in the Lake Salvador and Lake Cataouatche areas, located five miles west of the area. Active eagle nests are located in the Salvador Wildlife Management Area, (Kilgen, 1979).

4.2.2 Human.

4.2.2.1 Socio-Economics and Land Use.

The project area, as described in Section 2, is one of the most rapidly growing areas in the New Orleans Standard Metropolitan Statistical Area (SMSA) as is the entire west bank portion of Jefferson Parish

(Table 4.7). Between 1970 and 1980, population increased by 43 percent, from 46,594 to 66,681, in the project area and also by 43 percent, from 125,797 to 179,970, in the west bank portion of Jefferson Parish. During this same period the population of Jefferson Parish in its entirety grew 35 percent, from 337,568 to 454,592. The population currently (1980) residing in the project area represents 37 percent of the Jefferson Parish west bank population and 15 percent of the entire Jefferson Parish Population. The City of Westwego, which had a population of 12,663 in 1980, is the only incorporated community within the project area.

TABLE 4.7

TOTAL POPULATION IN THE PROJECT AREA,
WEST BANK, AND JEFFERSON PARISH
1970 - 1980

		CHANGE		
AREA	1970	1980	#	%
Project Area	46,594	66,681	20,087	43.1
West Bank	125,797	179,970	54,173	43.1
Jefferson Parish	337,568	454,592	117,024	34.7
NOSMSA*	1,046,470	1,187,073	140,603	13.4
Louisiana	3,644,638	4,205,900	561,263	15.4

*New Orleans Standard Metropolitan Statistical Area
Source: 1970 and 1980a Number of Inhabitants, U.S. Department of Commerce

In the following pages, the project area's socio-economic characteristics (1980) have been compared to those for the west bank and Jefferson Parish to gain a better understanding of the forces which have contributed to its development.

Housing units in the project area increased dramatically between 1970 and 1980. By 1980, the number had risen from 13,729 to 21,597, representing an increase of 7,868 or 57.3 percent (Table 4.8). This change is similar to that recorded for the west bank, but greater than that noted for the parish. The project area accounted for 32.0 percent of the increase experienced on the west bank, resulting in a significant amount of residential and commercial development. In 1980, 20,323 or 94.1 percent of these units were occupied (Table 4.9). The project

area's occupancy rate was comparable to the west bank and parish-wide averages of 92.0 percent and 93.7 percent, respectively. Approximately 71.0 percent of the occupied units were owner-occupied.

There were 5,078 residential building permits issued in the project area between 1975 and 1980. These permits accounted for 57.6 percent of the 8,819 permits issued for residential development on the west bank. The west bank's portion of the 29,618 permits issued in the entire parish during this period was 30.8 percent.[1]

TABLE 4.8

TOTAL HOUSING UNITS IN THE PROJECT AREA, WEST BANK, AND JEFFERSON PARISH 1970 - 1980

AREA	1970	1980	CHANGE #	CHANGE %
Project Area	13,729	21,597	7,868	57.3
West Bank	37,042	61,703	24,661	66.6
Jefferson Parish	101,522	166,124	64,602	63.6
NOSMSA*	345,769	455,298	109,529	31.7
Louisiana	1,150,950	1,547,594	396,644	34.5

*New Orleans Standard Metropolitan Statistical Area
Source: U. S. Department of Commerce, 1972 and 1982b.

There was an average of 3.24 persons per household in the project area in 1980. This figure is higher than the west bank average of 3.11 and the parish-wide average of 2.90.

In 1980, the Census Bureau reported that the median value of single-family housing was approximately $45,100 versus $48,500 in the remainder of the west bank and $56,700 in the parish (U.S. Department of Commerce, 1982b). The $154 per month average rent in the project area was significantly less than the $188 reported for the west bank and $242 reported for the parish. Recent trends suggest that the demand for

[1]Information provided by Gregory C. Rigamer, Consultant for Jefferson Parish council.

rental units in these areas will intensify as property values increase. In recent years, substantial increases in economic activity have had a major impact on the development of the project area's economy. This is evidenced by the development and expansion of the Lapalco, Barataria, and Manhattan Boulevard corridors. Most development has been residential and resident-oriented businesses. The primary causative factor for this development has been the availability of land coupled with the construction of low-to-moderate income housing. While the only readily available economic data are for Jefferson Parish, they are indicative of the project area's economy.

TABLE 4.9

SELECTED HOUSING CHARACTERISTICS FOR THE PROJECT AREA, WEST BANK AND JEFFERSON PARISH 1980

AREA	TOTAL OCCUPIED UNITS	OWNER UNITS	MEDIAN VALUE	RENTER UNITS	MEDIAN RENT	AVERAGE PER OCCUPIED UNITS
Project Area	20,323	14,425	$45,100	5,898	$154	3.24
West Bank	56,787	41,697	48,500	15,090	188	3.11
Jefferson	155,685	98,983	56,700	56,702	242	2.90
NOSMSA*	418,405	226,004	54,000	193,402	182	2.79
Louisiana	1,411,788	925,139	43,000	485,649	156	2.91

*New Orleans Standard Metropolitan Statistical Area
Source: U.S. Department of Commerce, 1982b.

In 1979, Jefferson Parish had the highest per capita income in the Standard Metropolitan Statistical Area (SMSA), $8,867. This figure represented 103.2 percent of the SMSA average of $8,596 (Table 4.10). In 1981, Jefferson Parish also had a substantially higher median household income (MHI) than the remainder of the SMSA. According to the 1981 Survey of Buying Power (Sales and Marketing Management, 1981), the Parish's MHI was $24,468 as compared to the SMSA average of $19,907 (Table 4.10). The buying income generated in Jefferson Parish in 1980 was $4.3 billion or 43.4 percent of an SMSA total of $9.9 billion.

In 1980, Jefferson Parish had an unemployment rate of 4.9 pecent versus the 6.8 percent reported for the SMSA (Table 4.10). This difference was due largely to the significant level of industrial activity in the parish.

TABLE 4.10

GENERAL ECONOMIC CHARACTERISTICS OF JEFFERSON PARISH, THE NEW ORLEANS SMSA[1], AND LOUISIANA 1979 AND 1980

AREA	PER CAPITA[2] INCOME	AVERAGE[3] WKLY WAGES	HOUSEHOLD MEDIAN INCOME	AVERAGE[4] COVERED EMP.	UNEMPLOYMENT RATE (%)
Jefferson	$8,867	$217.12	$24,468	155,056	4.9
NOSMSA	8,596	276.93	19,907	497,235	6.8
Louisiana	7,594	276.43	17,167	1,531,587	6.7

[1]Standard Metropolitan Statistical Area
[2]1979 is the latest year for which annual data is available.
[3]1980 is the latest year for which annual data is available.
[4]Employees covered by the Louisiana Employment Security Act.

Source: Sales and Marketing Management, Louisiana State Planning Office, April, 1982. Louisiana Department of Labor, 1980.

Industrial employment is a widely accepted measure of an economy's growth potential. In 1980, 56,290 persons or 36.3 percent of the parish's workforce of 155,056 were employed in the fields of mining, construction, transportation, and manufacturing. These individuals also accounted for 35.0 percent of the SMSA's industrial workforce. Major industrial employers in the parish are firms involved in oil and gas exploration activities, ship building, maintenance, and fleet operations. Many of these companies are located on the west bank along the Harvey Canal and the Mississippi River.

In recent years, the project area's population and economic growth have had a dramatic effect on its land use patterns by transforming a significant amount of acreage from undeveloped to urbanized uses. The major physical features and characteristics which have influenced land use in the project area, also known as the Marrero-Estelle Corridor, are the Mississippi River, the existence of several major transportation arterials, close proximity to several activity centers, the availability

of land suitable for development, and the availability of low-to-moderate priced housing.

The results of these characteristics are reflected in the project area's land use profile. The most important uses (residential, commercial, and industrial) are discussed in the following paragraphs:[1]

- In 1983, there are approximately 4,700 residential acres in the project area representing 26.1 percent of the total 18,000 project acres. Some 2,400 residential acres would be protected from tidal overflow from a 100-year frequency hurricane with project installation. No protection would be afforded from ponded rainfall flooding.

- Land in commercial (trade and services) uses equaled approximately 900 acres. Industrial acreage accounted for 850 acres. Completion of the proposed levee would provide protection from tidal surge related to 100-year return frequency hurricane occurences to some 1,150 acres in the commercial, public, and industrial category.

- Industrial uses accounted for 330 acres or 2.0 percent of the project area's estimated total acres.

Jefferson Parish, in its Development 2000: Comprehensive/Land Use Plan (Jefferson Parish Planning Department, 1981), addressed future patterns and directions expected to occur during the 20-year period from 1980 to 2000 as follows:

- Residential land uses will expand in areas near Barataria (Louisiana Highway 45) and Lapalco Boulevards and in the Lafitte-Larose area. Because of the increasing population pressures expected to occur, the development of high-density residential units will likely take place in present areas. While it is probable that medium to high-density developments will predominate in areas near the first two roadways, soil conditions and distance considerations will encourage low-density development in the Lafitte-Larose area.

- Commercial land uses along the West Bank Expressway will remain at their present levels because they are adequate to serve forecasted population growth. Commercial land uses are projected to increase significantly along the

[1]Information provided by Gregory C. Rigamer, Consultant for Jefferson Parish Council.

Lapalco and Barataria Boulevards as evidenced by the construction of several shopping centers at the intersection of these two arteries. Office parks, storage, distribution, and service facilities will continue to occupy a growing share of the commercially desirable land in the project area by the year 2000.

- Industrial land uses will also continue to grow, especially in areas north of the Estelle Outfall Canal. Industrial acreage in the project area along the Harvey Canal and the Mississippi River will more than likely be completely absorbed by the year 2000. Primary uses will continue to be oriented toward energy and ship-building industries.

Furthermore, the Regional Planning Commission projects that land on the east bank of Jefferson Parish will be almost completely absorbed by the year 2000. Consequently, west bank roadways such as Barataria and Lapalco Boulevards will continue as major development corridors in the future, due, in large part, to the availability of developable land in areas adjacent or near them.

4.2.2.2 General Development Trends.

As noted previously, the communities of Westwego, Marrero, and Estelle would be the principal beneficiaries if the proposed levee were to be implemented.

The project area has undergone a period of dramatic change since the mid-1960s. Directly related to the growth of the population has been the development of active suburban residential communities. Two of these which are located in the project area are Woodmere and Woodchase. These developments are forecasted to continue attracting in-migration because they contain housing which is widely affordable and in close proximity to several regional employment centers, including the Harvey Canal industrial corridor. In recent years, the Louisiana Highway 45 area has experienced substantial residential growth. The relatively high ground along the ridge in the Estelle area has encouraged development because of its suitability and the rapid absorption of land in other parts of the west bank.

The rapid growth of the west bank's population has also generated a significant demand for services of all types, especially medical and commercial. As a result, West Jefferson General Hospital was established to service the needs of this growing population. This facility is located within the project area and has a regional service area.

Commercial expansion has also been evident in the project area. As noted previously, commercial development has concentrated near the new growth areas adjacent to Lapalco and Barataria Boulevards.

This development has taken the form of strip commercial activities along portions of these roadways, and the establishment of three shopping centers near the intersection of these two streets. Two of the centers, Oakridge Plaza and Barataria Bazaar, are classified as neighborhood centers. Belle Promenade is a regional shopping center of one million square feet which serves the entire west bank and adjacent parishes. The level of capital invested in these centers is an indicator of the private sector's expectation for growth potential in the project area.

Current trends in the project area, therefore, indicate that flood protection is becoming increasingly important as population-induced demands and economic development intensify. The proposed levee, if implemented, would further encourage development in the project area by offering partial flood protection. The protection offered would only prevent damaging overflows from tidal surges having a return frequency of less than once in 100-years. For storms with a frequency exceeding the 100-year level, no protection would be offered. Additionally, flooding from ponded rainfall would not be eliminated or even reduced; it is possible that it could be exaggerated due to the newly constructed levees retarding the outflow of waters.

4.2.2.3 Archeological/Cultural Resources.

The survey methodology consisted of a literature search and records review, coupled with an on-site survey of the project area, sufficient to make appropriate determinations of cultural resources within the project area. Naturally occurring bayous and streams within the project area were given close attention, but no sites or evidence of human occupation were discovered. Shovel tests and probe investigations on sample transects normal to the alinements at stream crossings failed to locate any near surface buried sites. Inspection of dredge piles along the bayou and canal bank lines showed no evidence of artifactual materials dredged from deep below the present ground surface at these points. The review of previous investigations in the project area and the records review indicated that no archeological sites or other cultural resources were known to be located at these points. However, the area adjacent to the proposed levee is of potential archeological significance in that it is a buffer between the population concentrations of Westwego and Marrero, adjacent to the Mississippi River, and the archeological resources of the lake shores and marshes to the south.

Research of archeological/cultural resources within the project area focused on a certain set of high probability locations. The first of these areas was at Bayou des Familles and the des Familles ridge. Previously conducted work in the area indicated the presence of an archeological site concentration arrayed parallel to the natural levee ridge. This linear distribution of sites runs for a distance of approximately two miles and extends north of the Jean Lafitte National Historical Park property line a distance of about 3/4 miles (Plate 18).

A second area of high probability was made up of prehistoric site distributions in the southeastern coastal plain of Louisiana which occurred along the levee ridges of Mississippi River distributary channels. The levee ridge system provided dry land, elevated above the surrounding marsh and protected from periodic flooding, and access to the waterways for communication and subsistence exploitation.

A third area, along the east bank of Bayou Segnette, potentially contains either occupation or special function sites along the bank line levee ridge of a distributary channel. However, the undeveloped marsh-back swamp environments, while rich in subsistence resources and most certainly utilized by prehistoric population groups, were not environmentally suitable for residence.

A fourth area with a high probability of containing archeological/cultural resources was the wetland/urban interface in the northern section of the project area. Located in this section is the only concentration of standing structures, a small contemporary fishing community with residences, retail establishments, a seafood processing plant and docking facilities. The only standing structures of note are five typical southern Louisiana "shotgun singles." The construction of these homes could date from the early part of the twentieth century. All of them have been structurally altered from the classic style by various additions and enlargements and are in a bad state of repair. Consequently, none of them would constitute good examples of shotgun style in their present condition. The other standing structures in this concentration are of modern construction and are of no architectural or archeological merit (Beavers, 1981).

The interface between the Bayou des Familles levee backslope and the marsh/wetlands environment presents a secondary area of potential archeological/cultural resources. This interface is an ecotone or zone of contact between two adjacent environments or microenvironments, and as such provides the potential for a high energy concentration focus. In Odum's models (1971), ecotones are the setting for an increased variety and density of both plant and animal species as a result of a more productive habitat. In human exploitative terms, site locations along ecotones offer a potentially higher return for the subsistence energy invested. Sites located on these edges occupy a strategic position relative to the productivity of both or several environmental zones. The potential for sites on this edge would be confined to special function - subsistence exploitation camps. The relative proximity of this edge to the natural levee ridge, spatially, would argue for residence on the levee ridge, as demonstrated by the extant site distribution, with foraging parties operating out of the residential base camps. Thus, it would not be reasonable to expect residential occupation along this edge (Beavers, 1981).

As a result of the examination of various sources, no sites of National Register significance or those eligible for inclusion on the National Register of Historic Places were recorded as being located within the general project area. Although a Bayou des Familles/Bayou des Coquilles Archeological District has been proposed and documentation submitted to the Southwestern Regional Office of the National Park Service, no official nomination form has been processed; consequently, it is not currently listed on the National Register of Historic Places (DeBlieux, pers comm. 1981).

Another area of archeological/cultural significance partially within the project area is the Jean Lafitte National Historical Park. The park, which was established by Title IX of Public Law 95-625, is located to the south of the project area (Plate 18). The park consists of two areas totaling approximately 20,000 acres, the 8,600 acre core area and a 11,400 acre proposed park protection zone to the north. The National Park Service is acquiring sufficient land to develop facilities for visitor use and to support resources management and preservation within the core area. The management plan for the core area includes four major zones: the natural zone which includes a natural environment and protected representative natural community subzones: the cultural resources zone which includes the preservation subzone; the park development zone which includes the administrative, education/interpretive, access/circulation, and park utilities subzones; and the other use zone which includes the commercial subzone. The park's authorizing legislation designated a buffer north of the core area which was intended to help preserve the core area's natural values.

5. ENVIRONMENTAL EFFECTS

5.1 Introduction.

This section supplements Table 3.3, "Comparative Impacts of Alternatives", with a more detailed description of the impacts noted in the table. Discussions of acreages for the natural and human environments vary because of different requirements. The assessment of impacts on ecologically (natural environment) significant areas (Ecological Study Area) to be enclosed by each of the alternatives does not correspond to socio-economically significant areas that would also potentially be enclosed.

5.2 Natural.

Eight alternative levee alinements were proposed to protect the west bank communities of Jefferson Parish. These areas would be converted from their respective existing land uses to upland levee and open water borrow canals.

5.2.1 Marsh.

A total of 322 acres of fresh marsh exist within the Ecological Study Area (ESA). The degree of primary and secondary impacts to these available marshes are dependent upon which one of the alternatives is selected for construction.

5.2.1.1 Alternative A.

Alternative A would enclose the greatest amount of marsh. 4,477 acres of the ESA would be affected from the actual levee right-of-way inland to Louisiana Highway 45. All of the existing 322 acres of fresh marsh would be impacted by this alinement.

Construction of the levee would directly convert less than one percent of the overall marsh to upland and open water habitats through dredging activities. This alternative proposes no mechanism to allow continued surface water exchange between the enclosed marshes and surrounding habitats as the entire enclosed water regime will be regulated by two forced drainage control facilities (Ames and Westwego Pumping Stations). The remaining wetlands within the leveed region, including all marshes, would be lost.

5.2.1.2 Alternative B.

Alternative B would not pose any direct or indirect impacts to marsh habitats.

5.2.1.3 Alternative C.

Alternative C would enclose a maximum area of approximately 2,729 acres of which 276 acres is fresh marsh. All of the marshes involved in this alinement are located in the Bayou des Familles development tract. Two water exchange structures are proposed for this lower levee segment (Reach E to F) to allow for flow from the enclosed area. However, these two structures would not provide for adequate flow. In order to provide at least 90 percent of the current flow at least ten water control structures (two at each of five locations as shown on Plate 22) would be required to provide adequate tidal exchange. Without these structures most of the marsh would be lost.

The marsh habitats within the enclosed levee area, as a result of the combined effects of restricted tidal exchange through the flap-gate structures and forced drainage through the Ames Pumping Station, would be lost. The restriction of tidal exchange would reduce the contribution of nutrients to adjacent habitats. Increased eutrophication and stagnation of the affected marshes would be expected due to the restricted tidal exchange.

5.2.1.4 Alternative D.

Impacts to the marsh communities as a result of construction of Alternative D would essentially be the same as suggested under Alinement C (5.2.1.3).

5.2.1.5 Alternative E.

Alternative E would not pose any direct or indirect impacts to marsh habitats.

5.2.1.6 Alternative F.

Alternative F would enclose approximately 2,407 acres. All marshes involved in this alinement are located in the Bayou Segnette Oil Field area and total approximately 92 acres.

Initial levee construction would directly impact only a trace of the available enclosed marshes. However, secondary impacts resulting from hydrologic alterations and possible ultimate drainage of the area through the new Westwego Pumping Station are probable. Refer to additional discussions under Section 5.2.1.1.

5.2.1.7 Alternative G.

Alternative G would not pose any direct or indirect impacts to marsh habitats.

5.2.1.8 Alternative H.

Alternative H would not pose any direct or indirect impacts to marsh habitats.

5.2.2 Swamp.

Within the Ecological Study Area (ESA), swamps account for the largest single ecological habitat, totaling 1,748 acres. All levee alinements will have some direct and/or secondary impacts on the swamps.

5.2.2.1 Alternative A.

Alternative A would impound 1,748 acres of cypress-tupelogum swamp. Construction of the levee, including borrow areas, would directly affect about 13 percent of the swamps. Immediate impacts would consist of conversion of the swamps along the project right-of-way to upland and open-water communities. Approximately 461 acres would be involved in the immediate right-of-way for this alinement, and approximately one-half of that acreage (230 acres) would consist of cypress-tupelogum swamp.

The construction of the levee would act as a hydraulic barrier to the enclosed side of the project, isolating the swamps from free surface-water exchange. This blockage of the swamps would eliminate the present ecological community benefits derived from the affected swamps and would also reduce the energy transport and available aquatic nursery habitats which are dependent upon ingress and egress of surface waters. Productivity would decline initially in the enclosed swamps through the elimination of seasonal flooding.

Alternative A would rely upon the two new pumping stations, Ames and Westwego, for lifting stormwater and sewage treatment plant effluents from within the enclosed canals. Should pumping capacities exceed overall rainfall and other water sources within the enclosed area, long-term alteration and ultimate drainage and development of the wetlands would result.

5.2.2.2 Alternative B.

Alternative B would enclose approximately 552 acres of swamp.

Most of the swamps affected by this alternative are located in the northernmost sector of the Ecological Study Area (ESA), adjacent to the Westwego Sanitary Landfill (Reach B to C) and the lower CIT tract (Reach C to D). Segregation of the Westwego Landfill would be beneficial and would prevent further contamination and transport of polluted runoff. The lower CIT tract presently has a partially completed levee system which restricts water exchange with surrounding habitats.

The long-term fate of these swamps would be similar to those discussed in Section 5.2.2.1.

5.2.2.3 Alternative C.

Alternative C would enclose approximately 1,334 acres of swamp.

Impacts to the swamps in the northern sector of the project area (Reach B to D) are identical to those discussed in Section 5.2.2.2. The remaining swamps involved in this alternative are located in the Bayou des Familles tract (Reach E to F).

Flap-gate structures are proposed to be installed in levee Reach E to F. As discussed in Section 5.2.1.3, these facilities would highly restrict the natural exchange of tidal waters in this area and would, therefore, result in the loss of contributing energy benefits to adjacent communities.

Refer to Section 5.2.2.2. for a discussion of the long-term fate of this habitat as a result of drainage and development.

5.2.2.4 Alternative D.

Alternative D would involve the same swamps as Alternative C; therefore, potential impacts would be comparable. Refer to Section 5.2.2.3.

5.2.2.5 Alternative E.

Alternative E would essentially follow a wetland-nonwetland interface for right-of-way. One 61 acre stand of cypress-tupelogum swamp east of the Westwego Airport be enclosed as part of this alinement. Possible impacts to the swamp include complete isolation from present water exchange, drainage and ultimate development.

5.2.2.6 Alternative F.

Alternative F would essentially follow the same wetland-nonwetland alinement as Alternative E, with the exception of Reach B to 1. This section would include additional portions of the Bayou Segnette Oil Field and would enclose approximately 184 acres of swamp. Possible short- and long-term impacts would be similar to those discussed in Sections 5.2.2.1 and 5.2.2.5.

5.2.2.7 Alternative G.

Alternative G would also follow a wetland-nonwetland alinement identical to Alternative E with the exception of Reach 1 to 3. This section would include the lower CIT tract. Refer to Sections 5.2.2.2 and 5.2.2.5 for discussions of impacts.

5.2.2.8 Alternative H.

Alternative H would pose no direct or indirect impacts on swamps.

5.2.3 Bottomland Hardwoods.

All alinements, except Alternative H, would include one 368 acre region of hardwood forest within the enclosed side of the levee along the natural overbank levee on the western side of Bayou des Familles.

The construction of any of the alternatives would pose no direct impacts to this habitat; however, the flood protected project area would encourage urbanization, and would probably result in ultimate loss of the bottomland hardwoods.

5.2.4 Open Water and Aquatic Organisms.

Direct impacts to open water within the ESA would range from no habitat loss (Alternatives E and H) to a loss of 291 acres (Alternative A). Immediate loss of open-water habitats would occur in all areas of the project rights-of-way as a result of fill. The direct impacts to the open water would be minor and would account for insignificant losses of immobile aquatic species.

Secondary impacts to adjacent open water, pose the most significant, long-term habitat alterations. Within the impounded areas of the various levee alinements, the existing waterways (bayous and canals) would be virturally isolated from any outside water. Free exchange, which presently exists would be significantly reduced. Eutrophic conditions, degraded water quality, and increased aquatic vegetative productivity would occur.

Secondary impacts to the open water outside the enclosed area would also be anticipated. The alteration of drainage patterns and water quality would dictate the degree of impacts anticipated to these surrounding aquatic habitats and are discussed in detail in Section 5.2.5.

5.2.5 Water Quality Impacts of Alternatives.

Samples of surface sediment were collected from the proposed borrow area rights-of-way and analyzed by the Jefferson Parish Water Quality Laboratory to characterize existing contaminant levels. Sampling locations are shown on Plate 21 and results of the sediment analyses are appended. Aldrin, DDT, dieldrin, endrin, malathion, diazinon, parathion, and methyl parathion were detected in the sediment samples. The analyses provide a valuable inventory of the types and levels of compounds associated with sediments that would be disturbed during the proposed levee construction. However, the levels of compounds bound to sediments have no relationship to quantities that might be released to surface waters during dredge-and-fill operations.

When dredged sediments are placed as fill on submerged wetlands or discharged to waterways the potential exists for immediate release of pollutants from the sediments to the water. Trace metals, plant nutrients, and organic contaminants can be released from the disturbed sediments causing elevated concentrations in surface waters. Elutriate analysis is a commonly used method to characterize maximum containment concentrations that could be realized in surface waters during dredge-and-fill operations. The standard elutriate (EPA/COE, 1981) is the settled and centrifuged supernatant obtained from a vigorously mixed preparation of one-part sediment and four-parts surface water (by volume). Potential water column impacts are assessed by comparing a chemical analysis of a sample of the potentially affected surface water to an analysis of the standard elutriate. The mixing procedure employed to prepare the standard elutriate is intended to simulate the opportunity, which occurs during hydraulic dredging, for the release of contaminants from sediments to the water column. During the preparations of an elutriate some contaminants may be released from, and others, become absorbed by, suspended particulates. When net release occurs, a contaminants's concentration in the elutriate will increase relative to that measured in the ambient surface water. Conversely, when net adsorption occurs a contaminant's concentration in the elutriate will decrease relative to that measured in the surface water.

Four elutriates, prepared from mixtures of sediments collected from the borrow area rights-of-way and adjacent surface water, were analyzed by the Jefferson Parish Water Quality Laboratory. Results of the individual elutriate analyses are presented in the appendix and averaged measured elutriate concentrations are shown on Table 5.1. No analyses of the surface waters used to prepare the elutriates were performed. Consequently, no statements in regard to the magnitudes of changes in contaminant concentrations, attributable to the elutriation of sediment samples, can be made. In Table 5.1, average concentrations measured in the four elutriates are compared to average surface water concentrations observed during the Jefferson Parish sampling program. As is shown in Table 5.1, nine constituents, cyanide, arsenic, chromium, copper, iron, manganese, nickel, DDT, and endrin, had average elutriate concentrations which exceed the averages of observed ambient water concentrations. Four of these nine constituents - cyanide, copper, iron, and DDT - had average concentrations which exceeded the EPA freshwater criteria for chronic exposure or for 24-hour average concentrations. Cyanide had an average elutriate concentration which was about 144 times the EPA criterion for instantaneous maximum concentrations.

Table 5.1

COMPARISON OF AVERAGE CONTAMINANT
LEVELS MEASURED IN SURFACE WATERS AND STANDARD ELUTRIATES

PARAMETERS	AVERAGE AMBIENT WATER	AVERAGE ELUTRIATE
Cyanide (total) mg/l	0.37	7.5
Oil & Grease mg/l	23.63	0.0
Phenol (total) ug/l	3.42	3.06
Phosphorus (total) mg/l	1.77	0.85
Phosphorus ortho mg/l	1.61	-
Nitrogen-Nitrate - Nitrite mg/l	1.03	0.91
Nitrogen-Ammonia mg/l	1.99	1.36
Nitrogen-Total Kjeldahl mg/l	3.01	-
Antimony mg/l	<.005	<.005
Arsenic mg/l	0.002	0.020
Beryllium mg/l	0.0002	0.0002
Cadmium mg/l	0.001	0.0007
Chromium mg/l	0.002	0.004
Copper mg/l	0.022	0.025
Iron mg/l	0.41	13.55
Lead mg/l	0.009	0.004
Manganese mg/l	0.494	0.510
Mercury mg/l	0.0002	<.0001
Nickel mg/l	0.006	0.008
Zinc mg/l	0.078	0.041
Aldrin ng/l	5.67	0.0
DDT ng/l	18.46	52.16
Dieldrin ng/l	0.95	0.36
Endrin ng/l	0.01	0.033
Toxaphene ng/l	0.0	0.0
Malathion ng/l	48.61	0.0
Methyl Parathion ng/l	0.86	0.0
Parathion ng/l	12.26	0.0
Diazinon ng/l	157.21	8.35
2, 4, 5-T ng/l	11.10	0.68
PCB (total) ng/l	0.25	0.0
Silvex ng/l	5.59	0.425
2, 4-D ug/l	1.71	0.028

Source: C-K Associates, 1983

Comparison of the average elutriate to average observed ambient water concentrations suggests that the proposed levee construction does have the potential to further degrade water quality. However, comparing constituent concentrations measured in elutriates to those measured in the surface water is most appropriate when the proposed dredged material discharge is to be accomplished via hydraulic dredging. During hydraulic dredging, sediments are transported and discharged in the form of a slurry composed of about 20 percent solids and about 80 percent liquid. The bulk sediment is decomposed into relatively small sediment aggregates which undergo intense mixing and washing during excavation and transport. Bucket dredging has been proposed as the fill excavation method to be used for the levee construction. Since the bulk sediment essentially remains intact during bucket dredging activities, much less washing of the excavated fill occurs. Thus, (the opportunity) for desorption of sediment-bound contaminants (will be) considerably less when bucket dredging is employed.

Intensified suspended particulate and turbidity levels, elevated chemical and biochemical oxygen demands, and depressed dissolved oxygen concentrations result when dredge-and-fill operations are conducted on wetlands. The physical and chemical characteristics of highly organic water-logged sediments, such as those found in the project area, can change when exposed to the atmosphere and allowed to drain. Reduced, tightly-bound pollutants can become oxidized, and often more mobile, as drainage of the dredged material occurs. Subsequent rainfall elutriation of the dredged sediments, or structures built from dredged materials, can adversely impact the quality of immediately adjacent surface waters. Generally, the water quality impacts attendant to dredge-and-fill operations are relatively short term and restricted to the immediate vicinity of the work. Such short term water quality impacts are common to each of the structural alternatives.

The levee segment designated as E-F in Alternative alinements A, C, and D would encroach deeply into the "protection zone" of the Jean Lafitte National Historical Park. Construction of an unauthorized levee following the alinement of segment E-F of these three alternatives was interrupted in 1974. An instruction to cease the levee construction was issued in 1975 and a permit for completion of the levee was subsequently denied in 1979. Expectations were that subsidence and erosion would eventually result in reversion of the area to preconstruction conditions; consequently, the permit applicant was not required to degrade the completed work. This unmaintained levee does interfere with the free surface water exchange but does not impound or significantly impede water interchange. Completion of this levee would effectively capture a large part of the park protection zone on the protected side of the levee.

This would reduce the wetland acreage available to screen and filter stormwaters discharged from the urbanized area to the north. The park and its protection zone were authorized by Title IX-Jean Lafitte

National Park, PL 95-625, November 10, 1978. Title IX of PL 95-625 instructed the Secretary of Interior to develop guidelines applicable to the use and development of properties within the park protection zone. The guidelines were to be developed to preserve and protect: (a) freshwater drainage patterns from the park protection zone into the park core area; and (b) vegetation cover, the integrity of ecological and biological systems, and water and air quality within the park core area. Draft quidelines, designed to satisfy the environmentally protective intent expressed in Title IX of PL 95-625, have been developed; however, local approval of the guidelines is pending. The deep penetration into the park protection zone with levees, as proposed by Alternatives A, C, and D, would alter present drainage patterns. Altering existing drainage patterns would adversely affect water quality in the park protection zone and in the park core area. Additionally, the quantity of tidal exchange between wetlands on the protected and flood sides of the levee would be reduced by about 82 percent if one of these alternatives were to be implemented. Should tidal exchange be so reduced, water quality within wetlands captured on the protected side of the levee, if indeed allowed to remain wet, would be degraded over time. However, it is expected that any such water quality degradation would be short-termed, since logic precludes constructing a levee that restricts wetlands from flooding so that they might remain wet. It would seem more probable that the two proposed water exchange structures would be closed and that the captured wetlands would eventually be drained. Some of the borrow pits that would be created by extracting fill from construction would become principal interior drainage canals of the newly impounded area. These borrow canals would average about 15 feet deep and thus would intercept the shallow groundwater table of the impounded area. Subsequent normal dry-weather pumpage of the canal system would draw down natural groundwater levels in the vicinity of the canals. Some minimum water level in the new canals would probably be maintained to retard severe subsidence of the highly organic drained soils. The inevitable drainage and subsequent development of the captured wetlands would result in increased quantities of urban runoff and wastewater effluents being discharged to the remaining wetlands of the drainage area.

Levee alinements proposed by Alternatives E, F, and G more closely follow the present wetland-upland interface. These proposed alinements would not encroach into the park protection zone and, consequently, would not alter present drainage patterns or affect tidal exchange.

Levees constructed following alinements proposed by all structural alternatives except E and G would confine the Westwego Sanitary Landfill within the protected area. This would benefit water quality in wetlands and surface waters immediately adjacent to the landfill to some degree. Direct runoff and drainage from the site would be restricted, but all leachate from the landfill might not be intercepted by the levee and adjacent interior drainage canal. Surface runoff and intercepted drainage from the landfill would still be discharged to wetlands, albeit

more diluted, after collection and routing to the Westwego pumping station.

Secondary and cumulative water quality effects of the proposed construction relate to the quality and quantity of waters discharged from pumping stations. Dry-weather discharges from the pumping stations consist, principally, of treated wastewater effluents. Although much of the oxygen demand has been removed by treatment, plant nutrients, trace metals, and perhaps toxic organics remain. Jefferson Parish is currently engaged in upgrading older wastewater treatment facilities and constructing new ones; consequently, with time, some improvement in the quality of treatment plant effluent discharges is anticipated. The common practice has been to discharge treated effluent to the drainage canal system prior to it being pumped to wetlands. In some instances, well treated wastewater effluents might be of better quality than the drainage waters in the canal system. Even a properly functioning secondary treatment facility can not normally produce effluents with an average BOD_5 level substantially less than 30 mg/l. Consequently, although some upgrading of quality compared to present conditions is expected, dramatic improvement in the quality of future pumped discharges might not be possible.

Stormwater discharge, though intermittent, can contribute significant pollutant loads to receiving waterbodies. Planning-level estimates have been made of the average annual quantities of several pollutants discharged with stormwater from the Westwego area (USCE, 1977). The estimates suggest that in 1983 stormwater discharges from the Westwego area alone might contain on the order of 3.6 million pounds of solids and about 72,000 pounds of BOD_5. Stormwater pollutant loading is expected to increase with increasing development and population growth.

An indirect impact of the proposed construction could involve the accelerated development of about 4,600 acres (classified as non-wetlands) located to the east of Louisiana Highway 45. Water quality impacts attendant to development of this area would not directly affect surface waters of the project area. However, increased pollutant loadings to Bayou des Families and the Gulf Intracoastal Waterway would be expected through discharges through the Estelle pumping station or the Harvey Canal or through openings in the Bayou Barataria levee.

5.2.6 Wildlife.

The wildlife diversity within the ESA is directly linked to the proximity of the area to urban communities and water quality. The wildlife may be adversely impacted as a result of construction of any levee alinement.

5.2.6.1 Alternative A.

Alternative A would enclose the greatest extent of wildlife habitat. A total of 2,438 acres of wildlife habitat lies within the ESA.

Construction of the levee, including borrow canals, would completely disrupt approximately 461 acres of habitat through dredging and fill operations. Wildlife within these rights-of-way areas would be displaced. The more mobile species would relocate to adjacent suitable habitats, possibly resulting in overcrowding and environmental stress.

Following construction of the levee, the fate of the wildlife in the enclosed portions of the ESA would be directly related to the ability of the area to remain wet. As discussed in Section 4.2.1, the long term result of construction of the levee and impoundment of existing wetlands would be forced drainage, ultimate loss of the impounded habitats and development.

5.2.6.2. Alternative B.

Alternative B would impound approximately 920 acres of wildlife habitat (swamps and bottomland hardwood forests). No marsh habitat would be impounded as a part of this alternative. Approximately 354 acres would be directly impacted by levee construction. Probable impacts to wildlife from this levee alinement would be similar to those described in Section 5.2.6.1.

5.2.6.3 Alternative C.

Alternative C would impound approximately 1,978 acres of wildlife habitat, of which approximately 425 acres would be directly impacted by levee construction. Two flap-gate structures would be located in Reach E to F to allow for surface water exchange. However, present exchange rates will be significantly diminished. Probable impacts to wildlife within these regions would be similar to those described in Section 5.2.6.1.

5.2.6.4 Alternative D.

Probable impacts to wildlife as a result of Alternative D would be the same as those described for Aternative C in Section 5.2.6.3.

5.2.6.5 Alternative E.

Alternative E would follow the wetland/nonwetland interface and would pose only minor impacts to wildlife habitats. Impacts to wildlife would correspond to the vegetative community impacts discussed in Section 5.2.2.5.

5.2.6.6 Alternative F.

Alternative F would impound approximately 644 acres of wildlife habitat. Probable impacts to wildlife would be similar to those described in Section 5.2.6.1.

5.2.6.7 Alternative G.

Alternative G would impound a total of 782 acres of wildlife habitat. Probable impacts to wildlife would be similar to those described in Section 5.2.6.1.

5.2.6.8 Alternative H.

Alternative H would not pose any direct or indirect impacts on wildlife.

5.2.7 Endangered Species.

The only endangered species in the immediate Ecological Study Area (ESA) is the American alligator which is listed as threatened by "similarity of appearance." See Section 4.2.1.8.

5.2.7.1 Alternative A.

Alternative A would directly or indirectly impact a total of 2,361 acres of wetlands and waterways which, in their natural state, provide habitat for the American alligator. Initial construction of the levee would directly convert a small percentage of these acres to upland habitats but the proposed action does not directly effect the impounded habitats. However, enclosed wetlands would gradually become dry and developed. The impact to the American alligator would be gradual crowding and relocation of individuals to adjacent wetland habitats.

5.2.7.2 Alternative B through G.

The types of impacts would be similar to those described in Section 5.2.7.1.

5.2.7.3 Alternative H.

Alternative H would not pose any direct or indirect impacts on any endangered species.

5.3 Human.

5.3.1 Socio-Economics and Land Use.

5.3.1.1 General Consequences.

There are socio-economic and land use consequences of establishing a hurricane protection levee which are common to all alternatives. Analyses suggest that both the common and unique adverse impacts on the human environment are relatively minimal compared to the benefits of establishing an adequate hurricane protection levee.

One of the adverse consequences of constructing the proposed levee is the restriction of access to the Bayou Segnette dock. Alternative C which calls for the construction of a navigational flood gate approximately 1,000 feet south of the dock, is the only alternative not having an affect on accessibility. While this is not considered to be a major impact, it could hamper the operations of some marine operators requiring vehicular access to the dock. Its placement would limit access to the area where the stoplog closure (gate) would be located. Currently, access is provided at numerous locations.

The loss of land for the rights-of-way for the levee is a general adverse impact because all alternatives would consume land, which could have other uses. That is, under some alternatives, certain portions of the levee rights-of-way would be taken from lands that could be suitable for development. In other cases, rights-of-way requirements would be such that currently developable lands would be taken out of commerce. A primary example of this would be right-of-way on the Barataria Ridge, particularly in the Bayou des Familles area, where its high elevation has made it quite conducive to development. This would be experienced under the construction of Alternatives B, E, F, or G. Right-of-way requirements would range from 338 acres under Alternative F to 461 acres under Alternative A.

The construction of portions of the levee in an urbanized area (Westwego) would generate short-term adverse impacts on the human environment. These impacts include the generation of noise and air pollution, and general inconveniences. They are, however, considered minor because the affected area is commercialized with few residences.

Beneficial impacts of constructing the levee include flood protection from hurricane induced tidal surges having a return frequency equal to or less than once in 100 years. This protection would reduce the threat of the loss of life and property and would generate employment during construction and maintenance periods.

No hurricane-induced flooding has been experienced in the area during the period of record. However, a hurricane approaching the area on the "critical path" could induce tidal surges which would produce flooding. The reduction of the hurricane-induced tidal flooding would enhance the developmental potential of the area. As noted in Section 4, the west bank and the project area have experienced significant development since the mid-1960's because of the character of the economy, the saturation

of land development on the east bank, and the proximity of the area to the metropolitan major activity centers, e.g., the New Orleans Central Business District.

The induced development generated by project construction, while consistent with Jefferson Parish land use plans, would occur on lands marginally suited for development. As discussed in Section 4, the soil suitability for construction is very poor due to low shear strengths, high compressibility, and high subsidence rates. While structures would have to be built on piling foundations, a standard construction practice in the New Orleans area, land and roadway subsidence would continue to occur. This would yield higher maintenance costs for both public and private concerns.

The proposed levee will generate employment opportunities in Jefferson Parish during construction and maintenance periods. The unemployment rate in the New Orleans Standard Metropolitan Statistical Area (Jefferson, Orleans, St. Bernard, and St. Tammany Parishes) was 10.8 percent in September, 1983. Concurrently, the unemployment rate in the State of Louisiana was 12.0 percent and in the nation, 9.3 percent. It is anticipated that a number of jobs would be created, both directly and indirectly. Direct jobs would be those related to the levee's actual construction. Indirect jobs are those created as the revenues produced by the project filter through the rest of the economy. Such jobs would include those in retail activities, professional services and the like.

Because the levee would be built to local standards without Federal participation, it would be less expensive to construct under certain alternatives and only slightly more under others. Additionally, it could be completed in less time than Federal participation. Furthermore, the levee as proposed would be maintained to a height ranging from 8 to 10 feet. Based on historical experience and analyses of hypothetical hurricanes on various paths, a tidal surge from 5 to 7 feet NGVD in various reaches could be experienced as the result of a 100-year hurricane. A levee as shown on Plate 2 meets local standards for protection against this severe storm activity. Storms of greater intensity could overtop this levee, but the levee would still function to reduce tidal surge flooding. Note that the levee design concept requires regular maintenance activity to assure the desired level of protection, because compaction and subsidence will result in levee heights beginning to diminish immediately after construction.

5.3.1.2 Alternative A.

Alternative A would have several other socio-economic and land use impacts associated with its implementation.

Alternative A would require 461 acres for rights-of-way. Several land owners have indicated that they may donate 401.38 acres or 69.7 percent

of the total land required as rights-of-way. This would be contingent upon their properties being included within the area to be protected and developed. This would mean that 46.29 acres in Reach C to D (lower CIT tract), 93.15 acres in Reach D to E and 261.94 acres in Reach E to F (Bayou des Familles area) may be donated to Jefferson Parish.

The cost savings to Jefferson Parish would total $832,000. These donations would lower the financial burden to taxpayers from $14,253,000 to $13,421,000 or by 5.8 percent.

Approximately 3,640 acres would be enclosed, the largest area of any of the alternatives. This would induce extensive development throughout areas currently classified as wetlands. The Marrero-Estelle corridor has been a highly desirable development area because of its proximity to major employment and activity centers in the New Orleans SMSA. There is a need for moderately priced land to provide housing for low to middle-income buyers and renters. There are few other such areas available in the area.

5.3.1.3 Alternative B.

This alternative would generate several specific socio-economic and land use consequences:

This alternative would require 446 acres of right-of-way, 167.6 acres of which would be located along the Barataria Ridge (Reach E to F). This area is in the Marrero-Estelle corridor and is presently developable because of its elevation.

An addition 540 acres, primarily wetlands, would be enclosed. This acreage includes 552 acres of wetlands.

5.3.1.4 Alternative C.

This alternative would generate many specific socio-economic and land use consequences. 519 acres would be required as right-of-way. Alternative C would enclose an additional 1,940 more acres than currently leveed. Much of this acreage would be located in the Bayou des Familles area where development is not allowed under current Federal law without a Department of the Army permit. The selection of this alternative would improve Jefferson Parish's ability to accommodate the increasing development demands by inducing development on lands currently designated as wetlands.

The construction of navigation flood gates in the Westwego area (Reach A to B) would make Alternative C the most expensive alternative.

Alternative C would allow the Bayou Segnette dock area to remain as accessible as it is currently because flood gates south of the dock would eliminate the need for a levee. The facility could operate except during major storms when the flood gates could be closed.

5.3.1.5 Alternative D.

The alinement of Alternative D would be similar to that for Alternative C with the exception that a levee rather than navigation flood gates would be used in Reach A to B. Alternative D would require 540 acres for right-of-way. Alternative D would enclose an additional 1,940 acres; thus, inducing development on lands currently designated as wetlands.

5.3.1.6 Alternative E.

Alternative E, known as the wetland/nonwetland interface alinement, would be constructed adjacent to Louisiana Highway 45 for a lengthy segment. Alternative E would require 450 acres to be used as right-of-way. Similar to Alternative B, a notable portion (167.6 acres) would be located on the Barataria Ridge, a preferred development area. As with Alternative B, the placement of Alternative E in this location would preclude any further development on a significant portion of the ridge.

Alternative E would only enclose an additional 61 acres (wetlands); thus the potential for induced development of lands currently designated as wetlands would be minimized. Even though Alternative E would be one of the most restrictive alinements, the fact that it would represent an improved levee system is considered to be of significant benefit to residents of the project area.

5.3.1.7 Alternative F.

Alternative F would be very similar to Alternative E with the exception that it would enclose the Bayou Segnette Oil Field located south of Westwego. This alternative would require 418 acres for right-of-way. This could affect the development potential of the project area because 167.6 of these acres would be located along the Barataria Ridge. An additional 440 acres would be enclosed in the project area under Alternative F. This acreage would contain the Bayou Segnette Oil Field and is wetlands.

5.3.1.8 Alternative G.

Alternative G would also be similar to Alternative E, however it would enclose the lower CIT tract. Alternative G would require 468 acres for rights-of-way. Approximately 167.6 acres are located in the Bayou des Familles area along the Barataria Ridge.

Alternative G would enclose an additional 440 acres, the lower CIT tract, and induce future development on this currently designated wetland area.

5.3.1.9 Alternative H.

The No Action alternative. The existing natural environmental setting would remain as is and no ecologically adverse impacts would be generated. This alternative would disrupt the flood control plans for the project area as designed by Jefferson Parish. Existing residential and other forms of development would not be afforded adequate flood protection. Future residential development would be relegated to those areas where the first floor elevation would be equal to or higher than the 100-year floodplain. However, the no action alternative would decrease the probability of future development in areas currently classified as wetlands.

5.3.2 Archeological/Cultural Resources.

Based on information obtained from a cultural resources survey and assessment of the project area, there would be no adverse impacts directly related to any of the alternatives. An area of possible indirect impact is located within and adjacent to the Jean Lafitte National Historical Park (Plate 18) and near Reach F to G where Alternatives A through G tie into the V-shaped Levee. While no alternative would traverse this area, their close proximity to known cultural resources would require that efforts be taken to prevent construction activities from disturbing these resources. With regard to the Park, none of the alternatives would directly impact [illegible], either. However, Alternative A, C, and D segment the proposed Park Protection Zone. Alternative H is the only one which would not generate any direct or indirect impacts to archeological/cultural resources.

5.4 Mitigation and Other Impact Lessening Measures.

5.4.1 Natural Environment.

There are a number of mitigative measures to lessen the adverse impacts on the natural environment. They can be segmented into two types: planning and construction. Planning efforts include those programs being undertaken by Jefferson Parish through its various departments. Construction related measures are those that can be implemented either through design or when building the levee.

There are also three measures which could mitigate some of the adverse construction impacts to the natural environment. These measures apply to all of the alternatives.

Plans for constructing any of the alternatives would contain provisions for the implementation of short-term (construction period) measures to mitigate adverse impacts from noise, dust and equipment exhausts. These impacts could be lessened through the use of mufflers on equipment, watering of the construction site and pollution control devices.

During construction, efforts would be initiated to maintain the site in ways that minimize environmental disruption. Efforts include the collection and removal of construction refuse. Following construction, the levee would be seeded and fertilized to reduce soil erosion and provide a more esthetic appearance.

5.4.2 Human Environment.

There will be several adverse impacts on the human environment generated by the proposed hurricane protection levee. The two most notable ones are related to the levee's right-of-way requirements and the partial restriction of accessibility to the Bayou Segnette dock by some of the alternatives. There are also three other relatively minor impacts. They are the levee's crossing of three roadways (described below), the creation of areas containing stagnant water due to borrow pit requirements and the increased drainage needs of the developed portions of the Bayou des Familles area under Alternatives B, E, F, and G.

There are three measures which can be instituted to alleviate the other adverse impacts on the human environment discussed above. These include construction of a gate for vehicular access to the Bayou Segnette dock, provision for mosquito control, and construction of a water exchange structure.

All of the alternatives with the exception of Alternative C would require flood gates to gain vehicular and pedestrain access to the Bayou Segnette dock via Laroussini Street (Reach A to B). Engineering plans call for the construction of flood gates (stoplog closures) in this reach within the flood wall (Westwego side) and directly east of the dock. The gates would remain open at all times and would only close during periods of heavy storm activity.

Engineering plans for Alternative C call for the construction of a navigation floodgate to the south of the dock and across Bayou Segnette. This would alleviate the need for enclosing the dock area within a levee and, thus, not require flood gates for access, except in times of heavy storms.

Engineering design also includes the provision of ramps to mitigate the impacts on roadway access where the levee crosses Louisiana Avenue, Laroussini Street and Louisiana Highway 45. These ramps would be placed in Reaches A to B and F to G, and are included in the plans for each of the seven alinements.

Efforts will also be initiated by Jefferson Parish to control any potential increase in the mosquito population caused by the creation of areas of standing water. The use of borrow pits to supply the material to build the levee will create a number of "pond-type" areas conducive to the breeding of mosquitos. Jefferson Parish will, therefore, have these areas sprayed on a regular basis, both during and after construction.

The placement of a water exchange structure under Louisiana Highway 45 (reach E to F) is called for under Alternatives B, E, F, and G. Its purpose would be to allow for the drainage of the enclosed developed and developable portions of the Bayou des Familles area in the event of a major storm. This structure would not be needed under Alternative A because drainage would be provided via the new Ames Pumping Station. It also would not be required under Alternatives C and D because water exchange structures are included within the levee in this reach. The number and placement of water exchange structures needed to maintain the present flow in reach E to F is shown in Plate 22.

6.1 CORPS OF ENGINEERS

The following people were primarily responsible for preparing this Environment Impact Statement:

NAME	DISCIPLINE/ EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Charles E. DeWesse Col, CE	Civil Engineer	24 years Corps of Engineer	Project Manager
Ms. Laura J. Swilley	Biologist	9 years Corps of Engineers and U. S. Department of Commerce	EIS Coordinator
Mr. Cecil Soileau	Civil Engineer/ Hydraulic Engineer and Surveyor	21 years as Hydrolician responsible for Coastal and Riverine Water Resources Development	Study Manager for Engineering input to EIS
Mr. Billy Garrett	Civil Engineer/ Hydraulic Engineer	22 years Hydraulic Engineer Corps of Engineers	Assistant Study Manager for Engineering Input to EIS
Mr. Jay Combe	Civil Engineer Hydraulic Engineer	16 years Hydraulic Engineer 6 years Supv Hydraulic Engineer, Corps of Engineers	Flooding Hazard and Tidal Exchange
Ms. Janis Hote	Engineer/ Hydraulic Engineer	15 years Hydraulic Engineer Corps of Engineers	Flooding Hazard and Tidal Exchange
Mr. James Warren	Hydraulic Engineer/ Environmental Engineer	6 years Engineer, Corps of Engineers	Effects on Water Quality
Mr. Burnell Thibodeaux	Civil Engineer/ Environmental Engineer	9 years Engineer Corps of Engineers	Effects on Water Quality

NAME	DISCIPLINE/ EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Mr. Raul Velez-Gonzalez	Engineer/ Civil Engineer	5 years, Designer, Corps of Engineers	Levee Design
Mr. Ronald P. Lee	Engineer/ Civil Engineer	17 years, Designer, Corps of Engineers	Levee Design
Mr. Bruce Terrell	Engineer/ Cost Engineering	1 year Cost Estimating, R. J. L'Hoste & Co. 9 years Cost Engineering, Corps of Engineers	Cost Estimates
Mr. Frank C. Gagliano	Engineer/ Civil Engineer	14 years, Engineer, Corps of Engineers	Effects Requiring Relocation of Facilities
Mr. William W. Caver	Engineer/ Civil Engineer	3 years Consult Engineering, 15 years Soils Engineering Corps of Engineers	Soils Engineering Impacts
Ms. Judith Z. Gordon	Regional Economics/ Socioeconomics	11 years Corps of Engineers including 8 years in Flood Control project evaluation	Effects on Socioeconomic Environment
Mr. Warren de Sambourg	Real Estate Appraiser	25 years Appraisal Experience 9 years with Corps of Engineers	Real Estate Costs
Mr. Johnny D. Arnold	Real Estate Appraiser	23 years Appraisal Experience	Real Estate Costs

6.2 Others

NAME	DISCIPLINE/ EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Gregory C. Rigamer	Urban Planner	12 years in demographic/ land use elevation in Jefferson Parish, LA; EIA/EIS preparations	Project Manager
Alesia R. Devenish	Environmental Planner	5 years in land use planning EIA/EIS preparation	Project Coordination; report preparation
John M. Restrepo	Socio-Economic Planner	5 years in socio-economic evaluation; EIA/EIS preparations; feasibility studies	Socio-economic characterization
William G. Kennedy	Habitat Ecologist	11 years in ecological evaluation; EIA/EIS preparations	Habitat characterization; ecological impact determination
Harold Leone	Water Quality Specialist	8 years in lake and stream water quality studies	Water quality
Marilyn Gillespie	Estuarine Biologist	16 years in estaurine and marine biological studies	Estuarine characterization
Bill Corbin	Biologist/Wildlife Management	5 years in terrestrial evaluations; impacts determinations	Wildlife/terrestrial characterization
Emmet J. Mayer, Jr.	Civil Engineer	17 years in flood control projects including 13 years as chief engineer in levee design with Corps of Engineers, New Orleans District	Technical Management; engineering report preparation

NAME	DISCIPLINE/ EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Bruce W. Dyson	Civil Engineer	5 years in Structural Design; Master Drainage Planning; Flood Insurance studies	Levee design and cost estimates
Richard C. Beavers	Archaeologist	23 years in Engineering; archaeological/cultural resources field excavation and analyses	Principal in archaeological/ cultural resources field investigations and assessment
Theresia R. Lamb	Archaeology Research Associate	5 years in archaeological/ cultural resource research	Archaeological/cultural resources research
Gary B. DeMarcay	Archaeology Research Assistant	7 years in archeological/ cultural resource research and field investigations	Archaeological/cultural *resource field investigation* and assessment

7. PUBLIC INVOLVEMENT

7.1 Public Involvement Program

On July 13, 1981, the U. S. Army Corps of Engineers published a special public notice announcing the scoping meeting. This notice was mailed to over 2,000 individuals, government agencies, newspapers, television and radio stations. An announcement of the scoping meeting was included in the "Notice of Intent to Prepare an EIS," published in the Federal Register on July 22, 1981 (Vol. 46, No. 140).

The public meeting was held on August 13, 1981 in Harvey, Louisiana, to discuss the views of local interests concerning the Jefferson Parish West Bank Hurricane Protection Levee project. Approximately 80 individuals representing various Federal, state, and local agencies, engineering/environmental consulting firms, special interest organizations, the media and private interests attended the public scoping meeting. Corps representatives gave presentations concerning the history and purpose of the EIS and scoping processes, the history of the project and the Corps' role in the proposed project. The consultant representing the Jefferson Parish Council presented a description of the proposed project.

The major concerns of the people attending the scoping meeting included the impact of the proposed project on water quality in the area, the direct or indirect effect of the proposed project on the fish and wildlife resources in the area, its relationship to the growth/no growth limits and the potential development of wetlands enclosed by the levee. Additional concerns presented were

- the proposed project's interaction with existing or proposed Federal, state or local programs;
- the financing, cost and maintenance of the various alternatives;
- the history of storm surges in the area, flooding, flood insurance and flood protection;
- the responsibility for keeping the water exchange structures open; and
- the proposed project's affect on cultural resources in the area, especially the Jean Lafitte National Historical Park.

7.2 Statement Recipients

All Federal and state agencies, local governing authorities, environmental groups, individuals, and other interested groups listed below have received copies of this draft EIS. A news release announcing the availability of the draft EIS has been sent to all the local newspapers, radio and television stations.

7.2.1 Federal

J. Bennett Johnston, U. S. Senator
Russell B. Long, U. S. Senator
Lindy Boggs, U. S. Representative
Robert L. Livingston, U. S. Representative
Gillis W. Long, U. S. Representative
U. S. Department of Interior, Office of the Secretary, Washington, D. C.
Advisory Council on Historic Preservation
U. S. Fish and Wildlife Service, Regional Director, Atlanta Georgia
U. S. Fish and Wildlife Service, Field Supervisor, Lafayette, Louisiana
U. S. Environmental Protection Agency, Washington, D. C.
U. S. Environmental Protection Agency, Dallas, Texas
U. S. Department of Commerce, Washington, D. C.
U. S. Department of Commerce, National Marine Fisheries Service, St. Petersburg, Florida
U. S. Department of Commerce, Area Supervisor, Galveston, Texas
U. S. Department of Transportation, Federal Highway Administration, Baton Rouge, Louisiana
U. S. Department of Energy, Washington, D. C.
U. S. Army Engineer Division, Vicksburg, Mississippi
Heritage Conservation and Recreation Service, Atlanta, Georgia
U. S. Fish and Wildlife Service, Soil Conservation Service
Federal Emergency Management Administration
National Park Service, Jean Lafitte National Historical Park

7.2.2 State

State Senator, District 9
State Representatives, Districts 83 and 84
Office of the Governor, Baton Rouge, Louisiana
Office of the Attorney General, Baton Rouge, Louisiana
Louisiana Department of Health and Human Resources
Louisiana Department of Transportation and Development Office of Public Works
Louisiana Department of Transportation and Development Office of Highways
Louisiana Department of Agriculture
Louisiana Department of Commerce
Louisiana Department of Wildlife and Fisheries

Louisiana Department of Natural Resources, Division of State Lands
Louisiana Department of Natural Resources, Water Pollution Control Division
Louisiana State Historic Preservation Officer
The Joint Legislative Committee on Environmental Quality
Louisiana State Soil and Water Conservation Committee
Louisiana Department of Natural Resources, Coastal Management Section
West Jefferson Levee District

7.2.3 Local

President, Jefferson Parish Administration
President, Jefferson Parish Council
Councilmen, Districts 1 and 2
Director, Jefferson Parish Department of Public Utilities
Regional Planning Commission
Greater Jefferson Port Commission
Mayor, City of Westwego
Administrator, Jefferson Parish Coastal Zone Management
Jefferson Parish Planning Department
Director, Jefferson Parish Environmental and Development Control Department

7.2.4 Environmental Groups

Environmental Defense Fund
Louisiana Environmental Professionals Association
Funds for Animals, Inc.
Delta Chapter, National Sierra Club
National Wildlife Federation
Save Our Wetlands, Inc.
League of Women Voters
Orleans Audubon Society
National Audubon Society
Ecology Center of Louisiana

7.2.5 Others

Mr. Frank Ehret
Dr. Barry Kohl
Mrs.Charlotte Fremeaux
Mr. A. J. Plauche
G.C.R. and Associates
Marrero Land and Improvement Association
West Jefferson Civic Association
Mr. Oliver Houck

7.2.6 Locations Where EIS May Be Reviewed by Public

University of New Orleans Library
New Orleans District, Corps of Engineers
Clerk of the Council, Jefferson Parish Courthouse
Jefferson Parish Public Library, Marrero
Tulane University Library
Delgado Junior College Library, West Bank Campus

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9. APPENDIX

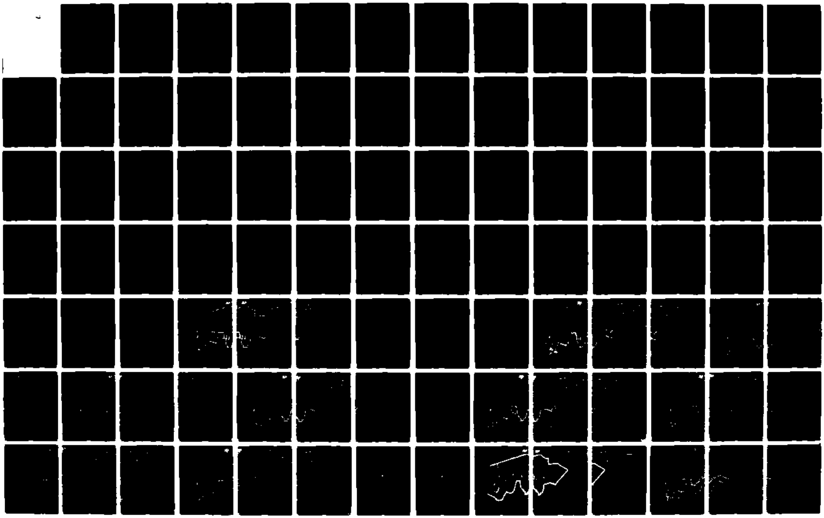
9.1 Jefferson Parish Water Quality Data

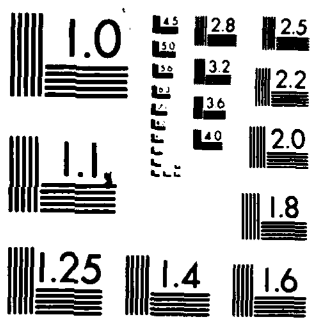
WATER SAMPLE #1

DATE 1982	2/23	3/24	4/21	5/27	6/23	7/21
Cyanide (total) mg/l	0.066	1.00	0.177	0.26	0.132	0.13
Oil & Grease mg/l	7.7	45.9	0.4	0.7	13.3	30.6
Phenol (total) ug/l	3.27	1.98	0.410	4.16	4.37	0.51
Phosphate (total) ug/l	3.18	6.70	2.55	1.38	2.6	1.9
Phosphate ortho mg/l	2.13	5.05	2.44	1.17	1.8	1.7
Nitrogen - Nitrate - Nitrite mg/l	3.89	0.93	0.52	0.65	0.48	0.52
Nitrogen - Ammonia mg/l	0	2.05	2.9	0.07	0.56	1.10
Nitrogen - total Kjeldahl mg/l	0	3.68	2.37	1.06	2.60	5.8
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	0.007	0.014
Beryllium mg/l	0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium mg/l	0.0008	<0.0001	0.002	<0.0001	0.0004	0.0008
Chromium mg/l	0.002	0.003	0.003	0.0025	<0.0001	0.0019
Copper mg/l	0.064	0.011	0.025	0.009	0.018	0.010
Iron mg/l	0.418	0.551	0.103	0.481	0.203	0.376
Lead mg/l	0.003	0.006	0.004	0.010	0.004	0.014
Manganese mg/l	0.330	0.545	0.023	0.460	0.404	2.703
Mercury mg/l	<0.0001	<0.0001	0.002	<0.0001	<0.0001	0.0001
Nickel mg/l	<0.001	0.006	<0.001	<0.001	0.0018	0.006
Zinc mg/l	0.259	0.030	0.205	0.046	0.075	0.054
Aldrin ng/l	5.28	2.66	2.50	0	0.47	0
D[illegible] ng/l	65.2	4.83	2.91	4.89	0	0
Dieldrin ng/l	0	0	0	1.88	1.18	1.70
Endrin ng/l	0	0	0	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	34.2	68.5	50.9	26.2	0	12.1
Methyl Parathion ng/l	0	8.36	2.70	0	0	0
Parathion ng/l	0	0	5.08	13.3	0	0
Diazinon ng/l	146	120	138	142	80.8	123
2, 4, 5-T ng/l	34.5	7.14	92.4	0	0	10.2
PCB (total) ng/l	0	0	0	0	0	0
Silver ng/l	10.1	4.08	8.89	7.97	0	2.35
2, 4-D ug/l	0.13	5.75	1.07	0.13	3.60	1.11

AD-A138 878 DRAFT ENVIRONMENTAL IMPACT STATEMENT WEST BANK HURRICANE PROTECTION LEVEE JEFFERSON PARISH LOUISIANA (U) ARMY ENGINEER DISTRICT NEW ORLEANS LA FEB 84 2/3

UNCLASSIFIED F/G 13/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

WATER SAMPLE #2

Date 1982	2/24	3/24	4/21	5/27	6/23	7/21
Cyanide (total) mg/l	0.026	0.032	0.248	0.32	0.214	0.13
Oil & Grease mg/l	36.6	38.8	0.0	1.0	13.5	33.8
Phenol (total) ug/l	6.2	0.52	0.95	5.32	4.25	0.51
Phosphate (total) mg/l	0.48	0.52	1.61	1.05	1.4	2.0
Phosphate ortho mg/l	0.51	0.80	1.64	1.27	1.4	1.70
Nitrogen-Nitrate - Nitrite mg/l	2.43	1.26	0.63	0.62	0.96	0.80
Nitrogen- Ammonia mg/l	5.2	0.09	0.89	0.019	0	0.03
Nitrogen- Total Kjeldahl mg/l	6.07	0.88	1.39	0.40	0	1.4
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	0.008	0.009
Beryllium mg/l	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium mg/l	0.0010	<0.0001	<0.0001	<0.0001	0.0007	0.0004
Chromium mg/l	0.002	0.002	0.002	0.0012	0.0003	0.0016
Copper mg/l	0.047	0.030	0.010	0.006	0.010	0.007
Iron mg/l	0.490	0.258	0.323	0.226	0.095	0.167
Lead mg/l	0.003	0.007	0.005	0.006	<0.001	0.002
Manganese mg/l	0.071	0.282	<0.001	0.332	0.359	2.207
Mercury mg/l	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0008
Nickel mg/l	0.011	0.004	0.002	<0.001	0.011	0.010
Zinc mg/l	0.148	0.033	0.068	0.025	0.0253	0.054
Aldrin ng/l	0.31	0	0.77	0	0	0
DDT ng/l	4.48	0	0	0	0	0
Dieldrin ng/l	0	0	0	1.22	0.53	1.12
Endrin ng/l	0	0	0	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	0	2.43	13.4	40.2	0	4.44
Methyl Parathion ng/l	0	0	2.70	0	0	0
Parathion ng/l	0	0	?	19.9	0	0
Diazinon ng/l	21.6	18.6	50.5	183	9.23	39.6
2, 4, 5-T ng/l	6.71	2.39	30.3	0	0	10.2
PCB (total) ng/l	0	0	0	0	0	0
Silvex ng/l	3.21	2.12	0.23	0	0	0
2, 4-D ug/l	0.04	0.27	0.14	0.16	0.09	0.07

WATER SAMPLE #3

DATE 1982	2/24	3/25	4/22	5/28	6/23	7/22
Cyanide (total) mg/l	0.128	0.214	3.78	0.14	0.300	0.21
Oil & Grease mg/l	52.4	13.7	3.9	31.8	17.3	56.7
Phenol (total) ug/l	20.21	5.20	10.6	2.90	10.34	0.0
Phosphate (total) mg/l	3.02	4.00	4.20	1.62	6.3	1.45
Phosphate ortho mg/l	2.99	3.55	4.40	1.75	4.7	1.35
Nitrogen-Nitrate - Nitrite mg/l	0.761	0.88	0.52	2.3	0.93	0.35
Nitrogen- Ammonia mg/l	3.2	2.29	8.0	0.52	0	0.15
Nitrogen- Total Kjeldahl mg/l	4.47	5.60	13.5	6.16	0	3.0
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	0.004	0.003
Beryllium mg/l	0.009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium mg/l	0.0011	0.0003	<0.0001	0.0001	0.0003	0.0003
Chromium mg/l	0.003	0.002	0.003	0.0011	0.0004	0.0018
Copper mg/l	0.31	0.021	0.012	0.009	0.025	0.013
Iron mg/l	1.194	1.067	1.112	0.692	0.284	0.502
Lead mg/l	0.005	0.007	0.010	0.007	<0.001	0.006
Manganese mg/l	0.248	0.817	0.846	0.635	0.787	0.414
Mercury mg/l	<0.0001	<0.0001	0.002	<0.0001	<0.0001	<0.0001
Nickel mg/l	0.004	0.008	0.008	0.015	0.008	<0.001
Zinc mg/l	0.152	0.090	0.068	0.158	0.0188	0.054
Aldrin ng/l	N/A	44.6	N/A	0	N/A	47.7
DDT ng/l	0	0	572	2.39	0	0
Dieldrin ng/l	0	0	5.20	4.21	0	1.55
Endrin ng/l	0	0	0	0	0	0
Toraphene ng/l	0	0	0	0	0	0
Malathion ng/l	165	428	544	83.2	72.7	103
Methyl Parathion ng/l	0	0	2.6	0	7.16	13.8
Parathion ng/l	65.8	0	101	147	93.0	37.6
Diazinon ng/l	586	545	1388	498	533	193
2, 4, 5-T ng/l	4.96	3.98	0	0	0	0
PCB (total) ng/l	0	0	0	0	0	0
Silvex ng/l	3.15	2.24	0	0	26.7	0
2, 4-D ug/l	0	4.61	0.11	0.04	25.5	0.34

WATER SAMPLE #4

Date 1982	2/24	3/25	4/22	5/28	6/24	7/22
Cyanide (total) mg/l	0.046	0.023	0.172	0.15	0.166	0.28
Oil & Grease mg/l	49.7	11.2	3.7	36.5	40.6	50.3
Phenol (total) ug/l	1.16	2.63	1.34	3.32	0.64	0.0
Phosphate (total) mg/l	1.16	1.50	1.20	1.55	2.1	1.7
Phosphate ortho mg/l	1.10	1.55	1.45	1.41	2.4	1.65
Nitrogen-Nitrate - Nitrite mg/l	0.066	0.70	0.20	0.66	0.46	0.10
Nitrogen-Ammonia mg/l	3.5	0.38	0.60	0.43	0.50	0
Nitrogen-Total Kjeldahl mg/l	3.77	1.20	2.01	3.06	0.64	0
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium mg/l	0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium mg/l	0.0001	<0.0002	<0.0001	<0.0001	0.0005	0.0010
Chromium mg/l	0.002	0.001	<0.0001	0.0016	0.0003	0.0019
Copper mg/l	0.068	0.006	0.004	0.007	0.014	0.015
Iron mg/l	0.633	0.222	0.413	0.215	0.135	0.005
Lead mg/l	0.005	0.003	0.002	0.003	0.003	0.005
Manganese mg/l	0.140	0.465	0.346	0.528	0.738	0.345
Mercury mg/l	<0.0001	<0.0001	0.0001	0.00011	<0.0001	<0.0001
Nickel mg/l	0.003	0.010	0.001	0.009	0.011	0.001
Zinc mg/l	0.148	0.060	0.044	0.069	0.0220	0.054
Aldrin ng/l	0	1.25	0	0	1.32	1.57
DDT ng/l	0	0.71	1.46	5.41	0	0
Dieldrin ng/l	0	0	0.78	3.21	0.53	0.54
Endrin ng/l	0	0	0	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	32.1	0	9.35	101	4.74	16.2
Methyl Parathion ng/l	0	0	0	0	0	0
Parathion ng/l	0	0	0	24.3	0	4.31
Diazinon ng/l	163	0	57.9	354	46.1	30.3
2, 4, 5-T ng/l	3.37	0	0	0	0	0
PCB (total) ng/l	0	0	0	0	0	0
Silvex ng/l	1.07	2.12	40.7	0	0	0
2, 4-D ug/l	0.05	0.60	0.10	12.4	0.08	0.06

WATER SAMPLE #5

Date 1982	2/24	3/24	4/22	5/28	6/23	7/22
Cyanide (total) mg/l	0.032	1.97	0.175	0.12	0.210	0.26
Oil & Grease mg/l	40.2	26.3	1.6	33.0	12.1	48.5
Phenol (total) ug/l	6.8	20.36	4.8	0.0	4.25	0.0
Phosphate (total) mg/l	2.24	1.50	3.04	1.37	5.1	2.3
Phosphate ortho mg/l	2.15	4.15	3.00	1.42	3.9	2.05
Nitrogen-Nitrate - Nitrite mg/l	0.413	1.29	0.32	0.53	1.72	0.27
Nitrogen- Ammonia mg/l	2.6	9.4	5.4	1.08	0	0.90
Nitrogen- Total Kjeldahl mg/l	2.87	10.68	7.91	4.36	0	3.4
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	0.011
Beryllium mg/l	0.0009	<0.0001	<0.0001	<0.0001	0.0013	<0.0001
Cadmium mg/l	0.0005	0.0066	<0.0001	0.0001	<0.0001	0.0004
Chromium mg/l	0.001	0.001	<0.0001	0.0011	0.0003	0.0016
Copper mg/l	0.205	0.008	0.016	0.023	0.009	0.047
Iron mg/l	0.812	0.462	0.685	0.323	0.135	0.418
Lead mg/l	0.003	0.005	0.005	0.003	<0.001	0.002
Manganese mg/l	0.180	0.801	0.540	0.427	0.709	0.324
Mercury mg/l	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Nickel mg/l	0.007	0.003	0.009	0.006	0.013	<0.001
Zinc mg/l	0.044	0.149	0.051	0.045	0.0155	0.043
Aldrin ng/l	0	18.9	17.9	0	1.78	32.8
DDT ng/l	15.3	127	62.4	2.19	0	0
Dieldrin ng/l	4.58	6.31	0	1.66	2.26	5.27
Endrin ng/l	0	0	0	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	0	102	151	56.1	17.4	149
Methyl Parathion ng/l	0	0	3.78	0	0	0
Parathion ng/l	0	0	27.6	16.6	9.45	23.4
Diazinon ng/l	216	385	502	167	356	161
2, 4, 5-T ng/l	13.7	9.52	N/A	31.5	30.3	0
PCB (total) ng/l	0	0	0	0	0	11.9
Silvex ng/l	0.93	5.60	N/A	9.40	19.0	5.56
2, 4-D ug/l	0.07	0.08	0.13	1.82	17.2	2.67

WATER SAMPLE #6

Date 1982	2/23	3/25	4/21	5/27	6/24	7/21
Cyanide (total) mg/l	0.082	0.015	0.382	0.48	0.162	0.30
Oil & Grease mg/l	7.1	22.7	1.1	1.3	42.1	50.8
Phenol (total) ug/l	2.65	1.48	3.82	2.35	4.09	0.0
Phosphate (total) mg/l	0.198	0.232	0.59	0.240	0.66	0.58
Phosphate ortho mg/l	0.192	0.51	0.48	0.125	0.64	0.46
Nitrogen-Nitrate - Nitrite mg/l	0.586	0.60	0.35	0.0	0.26	0.29
Nitrogen- Ammonia mg/l	0.44	0.145	0.30	0.0015	0.10	0.0
Nitrogen- Total Kjeldahl mg/l	0.55	0.50	0.77	0.08	0.46	10.8
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium mg/l	0.0007	<0.0001	<0.0001	<0.0001	<0.0003	<0.0001
Cadmium mg/l	0.0003	0.0080	0.003	0.0003	0.0012	0.0003
Chromium mg/l	0.001	0.003	0.002	0.0009	0.0011	0.0016
Copper mg/l	0.005	0.009	0.012	0.017	0.036	0.005
Iron mg/l	0.824	0.293	0.272	0.185	0.095	0.153
Lead mg/l	0.003	0.016	0.004	0.003	<0.001	<0.001
Manganese mg/l	0.182	0.359	0.077	0.185	0.375	0.655
Mercury mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel mg/l	0.008	0.005	0.002	0.008	0.004	<0.001
Zinc mg/l	0.048	0.266	0.017	0.027	0.0208	0.054
Aldrin ng/l	0	0	0	0	0	0
DDT ng/l	0.93	0	0	0	0	0
Dieldrin ng/l	0	0	0	0	0	0
Endrin ng/l	0	0	0	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	0	0	1.40	0	0	0
Methyl Parathion ng/l	0	0	0	0	0	0
Parathion ng/l	0	0	0	0	0	0
Diazinon ng/l	0	0	18.6	0	6.92	4.99
2, 4, 5-T ng/l	61.8	0	14.8	11.8	0	11.9
PCB (total) ng/l	0	0	0	0	0	0
Silvex ng/l	14.3	1.62	26.6	4.74	8.62	7.18
2, 4-D ug/l	0.07	0.17	0.10	0.06	1.23	0.39

WATER SAMPLE #7

Date 1982	2/23	3/25	4/21	5/23	6/24	7/21
Cyanide (total) mg/l	0.068	0.006	0.170	0.49	0.212	0.02
Oil & Grease mg/l	5.3	19.5	3.2	2.1	35.0	57.0
Phenol (total) ug/l	2.80	1.30	1.1	2.09	1.30	0.0
Phosphate (total) mg/l	0.230	0.204	0.58	0.320	0.54	0.76
Phosphate ortho mg/l	0.220	0.45	0.50	0.315	0.63	0.60
Nitrogen-Nitrate - Nitrite mg/l	0.530	0.44	3.82	0.0	0.28	0.25
Nitrogen- Ammonia mg/l	0.62	0.07	0.11	0.0037	0	0.0
Nitrogen- Total Kjeldahl mg/l	1.11	0.43	0.97	0.10	0	0.6
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium mg/l	0.0003	<0.0001	<0.0001	<0.0001	0.0004	<0.0001
Cadmium mg/l	<0.0001	0.0078	0.002	0.0002	0.0006	0.0005
Chromium mg/l	0.002	0.002	<0.0001	0.0011	0.0003	0.0017
Copper mg/l	0.002	0.014	0.026	0.037	0.027	0.008
Iron mg/l	0.597	0.196	0.259	0.182	0.176	0.348
Lead mg/l	0.002	0.010	<0.001	0.001	<0.001	0.003
Manganese mg/l	0.043	0.071	0.038	0.143	0.414	0.690
Mercury mg/l	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001
Nickel mg/l	<0.001	0.009	0.005	0.011	0.003	<0.001
Zinc mg/l	0.185	0.230	0.017	0.019	0.0214	0.079
Aldrin ng/l	0	0	0	0	0	0
DDT ng/l	0.93	0.64	0.73	1.77	0	0
Dieldrin ng/l	0	0.26	0.44	0	0	0
Endrin ng/l	0	0	0	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	0	0	27.1	0	0	0
Methyl Parathion ng/l	0	0	0	0	0	0
Parathion ng/l	0	0	0	0	0	0
Diazinon ng/l	0	0	12.0	0	0	0
2, 4, 5-T ng/l	10.9	2.39	23.1	11.8	0	19.8
PCB (total) ng/l	0	0	0	0	0	0
Silvex ng/l	7.93	1.62	7.40	3.78	6.03	2.08
2, 4-D ug/l	0.05	0.33	0.24	0.03	0.09	0.01

WATER SAMPLE #8

Date 1982	2/23	3/25	4/22	5/28	6/24	7/22
Cyanide (total) mg/l	0.082	0.054	0.153	0.30	0.191	0.23
Oil & Grease mg/l	3.0	16.0	3.2	47.1	31.1	34.6
Phenol (total) ug/l	2.30	1.12	4.2	1.58	4.99	0.0
Phosphate (total) mg/l	0.308	4.32	0.74	0.745	1.64	1.1[illegible]
Phosphate ortho mg/l	0.311	0.85	0.84	0.685	1.59	1.15
Nitrogen-Nitrate - Nitrite mg/l	0.582	0.72	0.0	0.57	0.41	0.31
Nitrogen- Ammonia mg/l	0.81	0.31	0.24	0.015	0.24	0.01
Nitrogen- Total Kjeldahl mg/l	1.51	0.86	0.86	1.66	1.56	0.00
Antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Beryllium mg/l	0.0003	<.0001	<0.0001	<0.0001	0.0003	<0.0001
Cadmium mg/l	0.0008	0.0062	<0.0001	0.0001	<0.0001	0.0008
Chromium mg/l	0.003	0.003	<0.0001	0.0014	<0.0001	0.0016
Copper mg/l	0.010	0.016	0.005	0.031	0.011	0.004
Iron mg/l	1.015	0.462	0.427	0.577	0.189	0.390
Lead mg/l	0.004	0.019	0.003	0.003	<0.001	0.003
Manganese mg/l	0.239	0.333	0.540	0.500	1.139	0.690
Mercury mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel mg/l	0.006	0.009	0.004	0.009	0.003	<0.001
Zinc mg/l	0.156	0.209	0.017	0.034	0.0249	0.029
Aldrin ng/l	0	0	0	0	0	0
DDT ng/l	0	3.99	4.06	2.19	0	0
Dieldrin ng/l	0	0.76	0.55	0	0	0
Endrin ng/l	0	0.13	0.11	0	0	0
Toxaphene ng/l	0	0	0	0	0	0
Malathion ng/l	0	0	17.8	0	0	0
Methyl Parathion ng/l	0	0	0	0	0	0
Parathion ng/l	0	0	0	0	0	0
Diazinon ng/l	0	27.0	35.0	0	188.0	0
2, 4, 5-T ng/l	63.6	0	0	0	0	9.92
PCB (total) ng/l	0	0	0	0	0	0
Silvex ng/l	7.93	1.87	0	3.15	0	0
2, 4-D ug/l	0.05	0.59	0.05	0.08	0	0.07

SEDIMENT SAMPLES

Date 5/5/82	A	B	C	D
Cyanide (total) mg/kg	3026	1298	2050	6949
Oil & Grease mg/kg	448.5	248.2	361.1	737.6
Phenol (total) ug/kg	80.6	112.8	64.1	404.7
Phosphate (total) mg/kg	526.5	264.2	242.1	236.0
Phosphate ortho mg/kg	1.48	0.08	0.05	0.15
Nitrogen- Total Kjeldahl mg/kg	134.9	60.5	48.6	165.8
Nitrogen- Ammonia mg/kg	5.46	4.26	1.06	15.26
Antimony mg/kg	<0.001	<.001	<.001	<0.001
Arsenic mg/kg	0.77	2.18	1.46	4.18
Beryllium mg/kg	3.79	2.35	2.42	1.67
Cadmium mg/kg	0.68	0.35	0.29	0.96
Chromium mg/kg	28.57	15.18	19.35	13.39
Copper mg/kg	32.21	18.75	25.48	58.56
Iron mg/kg	20000	18438	19444	16667
Lead mg/kg	18.0	10.0	11.8	58.0
Manganese mg/kg	259.16	233.80	250.70	191.55
Mercury mg/kg	0.024	0.011	0.011	0.063
Nickel mg/kg	18.67	24.89	19.56	10.67
Zinc mg/kg	156.56	85.07	77.83	234.84
Aldrin ng/kg	0	55.7	0	0
DDT ng/kg	1575	0	3335	4665
Dieldrin ng/kg	721	0	52.2	0
Endrin ng/kg	0	0	81.1	656
Toxaphene ng/kg	0	0	0	0
Malathion ng/kg	0	0	0	6918
Methyl Parathion ng/kg	0	0	0	7122
Parathion ng/kg	0	0	0	9360
Diazinon ng/kg	0	0	0	7630
PCB (total) ng/kg	0	0	0	0

SEDIMENT SAMPLES

Date 5/6/82	E	F	G	H
Cyanide (total) mg/kg	1294	357	263	417
Oil & Grease mg/kg	1084.9	3028.9	295.8	480.3
Phenol (total) ug/kg	72.4	112.3	17.7	144.1
Phosphate (total) mg/kg	5.6	18.3	0.7	13.6
Phosphate ortho mg/kg	0.05	0.06	0.03	0.03
Nitrogen-Total Kjeldahl mg/kg	710.1	362.0	238.3	88.4
Nitrogen-Ammonia mg/kg	10.26	9.91	0.16	2.18
Antimony mg/kg	<0.001	<0.001	<0.001	<0.001
Arsenic mg/kg	1.12	1.39	3.15	0.65
Beryllium mg/kg	2.00	2.73	3.58	2.50
Cadmium mg/kg	0.22	0.29	0.48	0.19
Chromium mg/kg	17.11	20.09	23.07	16.37
Copper mg/kg	15.39	18.27	25.39	22.69
Iron mg/kg	13194	17361	20694	13333
Lead mg/kg	17.0	16.25	12.75	10.0
Manganese mg/kg	185.92	152.11	267.61	126.76
Mercury mg/kg	0.011	0.011	0.011	0.021
Nickel mg/kg	8.89	17.78	15.11	8.0
Zinc mg/kg	192.76	116.90	85.97	84.16
Aldrin ng/kg	0	329	0	0
DDT ng/kg	0	6553	0	0
Dieldrin ng/kg	0	0	0	0
Endrin ng/lkg	0	0	60	0
Toxaphene ng/kg	0	0	0	0
Malathion ng/kg	0	0	1591	0
Methyl Parathion ng/kg	0	0	0	0
Parathion ng/kg	0	0	0	0
Diazinon ng/kg	0	0	0	0
PCB (total) ng/kg	0	0	0	0

ELUTRIATE SAMPLES

Date 7/6/82	#1	#2	#3	#4
Cyanide (total) mg/l	7.2	11.5	5.0	6.3
Oil & Grease mg/l	0	0	0	0
Phenol (total) ug/l	1.93	3.46	5.06	1.79
Phosphate (total) mg/l	- -	0.58	1.50	0.46
Nitrogen-Nitrate - Nitrite mg/l	- -	1.096	0.855	0.765
Nitrogen- Ammonia mg/l	3.0	0.76	1.10	0.56
Antimony mg/l	<0.005	<0.005	<0.005	<0.005
Arsenic mg/l	0.030	0.020	0.018	0.013
Beryllium mg/l	0.0003	0.0002	<0.0001	0.0002
Cadmium mg/l	0.0007	0.0011	0.0003	0.0005
Chromium mg/l	0.0087	0.0020	0.0007	0.0045
Copper mg/l	0.024	0.025	0.020	0.030
Iron mg/l	4.76	2.51	1.38	4.90
Lead mg/l	0.008	0.005	<0.001	0.003
Manganese mg/l	0.442	0.762	0.429	0.408
Mercury mg/l	<0.0001	<0.0001	<0.0001	<0.0001
Nickel mg/l	0.001	0.019	0.006	0.004
Zinc mg/l	0.052	0.035	0.035	0.041
Aldrin ng/l	0	0	0	0
DDT ng/l	0.25	27.1	133	48.3
Dieldrin ng/l	0.32	0	1.13	0
Endrin ng/l	0.13	0	0	0
Toxaphene ng/l	0	0	0	0
Malathion ng/l	0	0	0	0
Methyl Parathion ng/l	0	0	0	0
Parathion ng/l	0	0	0	0
Diazinon ng/l	0	0	16.7	16.7
2, 4, 5-T ng/l	0	0	0	2.7
2, 4-D ug/l	0	0	0.04	0.07
Silvex ng/l	0	0	0	1.7
PCB (total) ng/l	0	0	0	0

9.2 Statistical Summary of Water Quality Data From U. S. Geological Survey Sampling in the Bayou Segnette Drainage Area

295202090093200
29 52 02.0 090 09 32.0 2
BAYOU SEGNETTE 2.9 MILES SOUTH OF WESTWEGO,LA
22051 LOUISIANA JEFFERSON

TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624164-0290685

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		12	23.6666	44.1960	6.64801	34.0000	14.0000	81/04/28	82/03/04
00028	ANALYZE	AGENCY	CODE		12	80015.0-	.595E+04	.000000	80020.0	80010.0	81/04/28	82/03/04
00076	TURB	TRBIDMTR	HACH FTU		12	11.0833	16.8107	4.10008	15.0000	3.00000	81/04/28	82/03/04
00080	COLOR	PT-CO	UNITS		12	54.1665	62.8942	7.93058	70.0000	40.0000	81/04/28	82/03/04
00095	CNDUCTVY	AT 25C	MICROMHO		12	2402.33	1148322	1071.60	4550.00	968.000	81/04/28	82/03/04
00300	DO		MG/L		12	5.95833	7.78269	2.78975	10.7000	1.80000	81/04/28	82/03/04
00310	BOD	5 DAY	MG/L		12	4.44166	3.18268	1.78401	6.90000	1.70000	81/04/28	82/03/04
00340	COD	HI LEVEL	MG/L		11	120.364	6039.66	77.7153	340.000	68.0000	81/04/28	82/03/04
				K	1	10.0000			10.0000	10.0000	81/12/17	81/12/17
				TOT	12	111.167	6505.61	80.6574	340.000	10.0000	81/04/28	82/03/04
00400	PH		SU		12	6.95833	.137251	.370474	7.40000	6.30000	81/04/28	82/03/04
00403	LAB	PH	SU		10	7.36000	.031603	.177771	7.60000	7.00000	81/04/28	82/01/27
00410	T ALK	CACO3	MG/L		12	113.333	336.801	18.3521	148.000	76.0000	81/04/28	82/03/04
00530	RESIDUE	TOT NFLT	MG/L		12	32.7500	376.208	19.3961	83.0000	9.00000	81/04/28	82/03/04
00602	DISS.	NITROGEN	MG/L N		12	5.58333	43.6124	6.60397	26.0000	1.70000	81/04/28	82/03/04
00607	ORG N	DISS-N	MG/L		12	3.39999	46.3818	6.81042	25.0000	.900001	81/04/28	82/03/04
00608	NH3+NH4-	N DISS	MG/L		12	1.01917	.306610	.553724	2.00000	.160000	81/04/28	82/03/04
00623	KJELDL N	DISS	MG/L		12	4.42499	46.6147	6.82750	26.0000	1.30000	81/04/28	82/03/04
00630	NO2&NO3	N-TOTAL	MG/L		1	.560000			.560000	.560000	81/05/19	81/05/19
00631	NO2&NO3	N-DISS	MG/L		12	1.18250	1.36800	1.16962	4.00000	.080000	81/04/28	82/03/04
00665	PHOS-TOT		MG/L P		12	1.02083	.387898	.622815	2.30000	.040000	81/04/28	82/03/04
00900	TOT HARD	CACO3	MG/L		12	338.333	9851.45	99.2545	460.000	150.000	81/04/28	82/03/04
00902	NC HARD	CACO3	MG/L		12	223.000	8366.17	91.4668	340.000	76.0000	81/04/28	82/03/04
00915	CALCIUM	CA,DISS	MG/L		12	70.1666	543.253	23.3078	120.000	41.0000	81/04/28	82/03/04
00925	MGNSIUM	MG,DISS	MG/L		12	39.6666	250.248	15.8192	66.0000	12.0000	81/04/28	82/03/04
00930	SODIUM	NA,DISS	MG/L		12	345.833	38772.0	196.906	750.000	130.000	81/04/28	82/03/04
00931	SODIUM	ADSBTION	RATIO		12	8.30833	18.4664	[illegible]	[illegible]	3.40000	81/04/28	82/03/04
00932	PERCENT	SODIUM	%		12	65.5833	106.26	[illegible]	[illegible]	44.0000	81/04/28	82/03/04
00935	PTSSIUM	K,DISS	MG/L		12	11.8000	38.6811	[illegible]	[illegible]	6.00000	81/04/28	82/03/04
00940	CHLORIDE	TOTAL	MG/L		12	580.832	125010	[illegible]	[illegible]	220.000	81/04/28	82/03/04
00945	SULFATE	SO4-TOT	MG/L		12	172.500	8438.62	91.8620	360.000	70.0000	81/04/28	82/03/04
00950	FLUORIDE	F,DISS	MG/L		12	.266666	.011515	.107310	.400000	.100000	81/04/28	82/03/04
00955	SILICA	DISOLVED	MG/L		12	7.17500	13.9439	3.73415	14.0000	2.30000	81/04/28	82/03/04
01046	IRON	FE,DISS	UG/L		2	50.0000	200.000	14.1421	60.0000	40.0000	82/02/24	82/03/04
01056	MANGNESE	MN,DISS	UG/L		2	1595.00	2442051	1562.71	2700.00	490.000	82/02/24	82/03/04
31625	FEC COLI	M-FCAGAD	/100 ML		2	440.000	96800.0	311.127	660.000	220.000	82/02/24	82/03/04
				B	9	37.4444	716.030	26.7587	90.0000	5.00000	81/04/28	82/01/27
				TOT	11	110.636	36770.2	191.756	660.000	5.00000	81/04/28	82/03/04
31673	FECSTREP	MFKFAGAR	/100ML		10	1654.00	2399939	1549.17	4600.00	350.000	81/05/19	82/03/04
				B	2	330.000	204800	452.548	650.000	10.0000	81/04/28	81/07/20
				TOT	12	1433.33	2247808	1499.27	4600.00	10.00000	81/04/28	82/03/04

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BAYOU SEGNETTE 2.9 MILES SOUTH OF WESTWEGO,LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624164-0290685

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
70300 RESIDUE	DISS-180	C MG/L		12	1361.50	337095	580.599	2450.00	538.000	81/04/28	82/03/04
70301 DISS SOL	SUM	MG/L		12	1295.75	322359	567.767	2440.00	534.000	81/04/28	82/03/04
70303 DISS SOL	TONS PER	ACRE-FT		12	1.85166	.623498	.789619	3.33000	.730000	81/04/28	82/03/04
71846 AMMONIA	DISS-NH4	MG/L		12	1.30917	.511334	.715077	2.60000	.210000	81/04/28	82/03/04
71886 TOTAL P	AS PO4	MG/L		12	3.13500	3.66418	1.91421	7.10000	.120000	81/04/28	82/03/04
82068 POTAS-40	K-40,DIS	PC/LITER		4	6.35000	2.89673	1.70198	8.20000	4.10000	81/04/28	81/07/20

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MILLAUDON CANAL NEAR WESTWEGO, LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624151-0289534

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		12	23.0833	37.9925	6.16381	31.5000	14.0000	81/04/28	82/03/04
00023	ANALYZE	AGENCY	CODE		12	80015.0	-.595E+04	.000000	80020.0	80010.0	81/04/28	82/03/04
00076	TURB	TRBIDMTR	HACH FTU		12	5.41667	2.81064	1.67649	9.00000	4.00000	81/04/28	82/03/04
00080	COLOR	PT-CO	UNITS		12	45.4165	279.368	16.7143	70.0000	5.00000	81/04/28	82/03/04
00095	CNDUCTVY	AT 25C	MICROMHO		12	1485.50	573181	757.087	3220.00	520.000	81/04/28	82/03/04
00300	DO		MG/L		12	.575000	.436591	.660750	2.30000	.000000	81/04/28	82/03/04
00310	BOD	5 DAY	MG/L		12	7.05000	.973655	.986740	8.80000	5.40000	81/04/28	82/03/04
00340	COD	HI LEVEL	MG/L		11	129.182	8611.37	92.7975	390.000	69.0000	81/04/28	82/03/04
				K	1	10.0000			10.0000	10.0000	81/12/17	81/12/17
				TOT	12	119.250	9012.21	94.9326	390.000	10.0000	81/04/28	82/03/04
00400	PH		SU		12	6.97500	.032959	.181546	7.30000	6.70000	81/04/28	82/03/04
00403	LAB	PH	SU		10	7.19000	.154378	.392910	8.20000	6.80000	81/04/28	82/01/27
00410	T ALK	CACO3	MG/L		12	219.250	2776.40	52.6916	273.000	125.000	81/04/28	82/03/04
00530	RESIDUE	TOT NFLT	MG/L		12	17.4167	215.356	14.6750	58.0000	1.00000	81/04/28	82/03/04
00602	DISS.	NITROGEN	MG/L N		12	10.9258	52.9762	7.27847	25.0000	.710001	81/04/28	82/03/04
00607	ORG N	DISS-N	MG/L		11	4.31818	29.7456	5.45395	18.0000	.000000	81/04/28	82/03/04
00608	NH3+NH4-	N DISS	MG/L		11	8.07818	23.7729	4.87574	17.0000	.160000	81/04/28	82/03/04
				K	1	.070000			.070000	.070000	81/08/06	81/08/06
				TOT	12	7.41083	26.9560	5.13191	17.0000	.070000	81/04/28	82/03/04
00623	KJELDL N	DISS	MG/L		12	10.7492	54.3484	7.37214	25.0000	.590000	81/04/28	82/03/04
00630	NO2&NO3	N-TOTAL	MG/L		1	.050000			.050000	.050000	81/05/19	81/05/19
00631	NO2&NO3	N-DISS	MG/L		12	.223333	.163188	.403965	1.50000	.040000	81/04/28	82/03/04
00665	PHOS-TOT		MG/L P		12	4.30833	2.93539	1.71330	8.40000	3.00000	81/04/28	82/03/04
00900	TOT HARD	CACO3	MG/L		12	262.500	5729.64	75.6944	400.000	120.000	81/04/28	82/03/04
00902	NC HARD	CACO3	MG/L		12	51.4999	5043.80	71.0549	250.000	.000000	81/04/28	82/03/04
00915	CALCIUM	CA,DISS	MG/L		12	59.8333	160.887	12.6841	81.0000	32.0000	81/04/28	82/03/04
00916	CALCIUM	CA-TOT	MG/L		1	59.0000			59.0000	59.0000	81/12/17	81/12/17
00925	MGNSIUM	MG,DISS	MG/L		12	27.5499	192.724	13.8825	59.0000	8.60000	81/04/28	82/03/04
00930	SODIUM	NA,DISS	MG/L		12	189.083	17339.2	131.678	490.000	44.0000	81/04/28	82/03/04
00931	SODIUM	ADSBTION	RATIO		12	4.98333	8.43608	2.90449	11.0000	1.90000	81/04/28	82/03/04
00932	PERCENT	SODIUM	%		12	55.5833	105.000	10.2470	72.0000	44.0000	81/04/28	82/03/04
00935	PTSSIUM	K,DISS	MG/L		12	9.95833	17.9208	4.23330	18.0000	4.90000	81/04/28	82/03/04
00940	CHLORIDE	TOTAL	MG/L		12	294.166	56880.9	238.497	880.000	60.0000	81/04/28	82/03/04
00945	SULFATE	SO4-TOT	MG/L		12	65.5832	1351.91	36.7684	150.000	18.0000	81/04/28	82/03/04
00950	FLUORIDE	F,DISS	MG/L		12	.291666	.008106	.090035	.400000	.100000	81/04/28	82/03/04
00955	SILICA	DISOLVED	MG/L		12	13.5583	11.3045	3.35222	19.0000	7.70000	81/04/28	82/03/04
01046	IRON	FE,DISS	UG/L		2	209.500	34060.5	184.555	340.000	79.0000	82/02/24	82/03/04
01056	MANGNESE	MN,DISS	UG/L		2	780.000	3200.00	56.5685	820.000	740.000	82/02/24	82/03/04
31625	FEC COLI	M-FCAGAR	/100 ML		5	8040.00	.138E+09	11778.9	29000.0	1400.00	81/04/28	82/02/24
				B	4	19800.0	.942E+09	30696.0	65000.0	300.000	81/07/01	81/12/17
				L	1	800.000			800.000	800.000	82/03/04	82/03/04

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MILLAUDON CANAL NEAR WESTWEGO, LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624151-0289534

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
31625 FEC COLI	M-FCAGAD	/100 ML	TOT	10	12020.0	.425E+09	20626.1	65000.0	300.000	81/04/28	82/03/04
31673 FECSTREP	MFKFAGAR	/100ML		11	8421.81	.104E+09	10211.2	35000.0	940.000	81/04/28	82 ^3/04
			B	1	110000			110000	110000	81/09/01	81/09/01
			TOT	12	16886.7	.954E+09	30897.1	110000	940.000	81/04/28	82/03/04
70300 RESIDUE	DISS-180	C MG/L		12	823.499	196162	442.901	1870.00	265.000	81/04/28	82/03/04
70301 DISS SOL	SUM	MG/L		12	796.582	173000	415.933	1750.00	260.000	81/04/28	82/03/04
70303 DISS SOL	TONS PER	ACRE-FT		12	1.11917	.361990	.601656	2.54000	.360000	81/04/28	82/03/04
71846 AMMONIA	DISS-NH4	MG/L		12	9.51666	44.6217	6.67995	22.0000	.090000	81/04/28	82/03/04
71886 TOTAL P	AS PO4	MG/L		12	14.6833	27.8288	5.27530	26.0000	9.20000	81/04/28	82/03/04
82068 POTAS-40	K-40,DIS	PC/LITER		3	7.76666	21.4434	4.63071	13.0000	4.20000	81/04/28	81/07/01

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BAYOU SEGNETTE 4.6 MILES SOUTH OF WESTWEGO,LA
22051 LOUISIANA JEFFERSON

TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624147-0289496

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		12	23.5416	48.9744	6.99817	34.0000	12.5000	81/04/28	82/03/04
00028	ANALYZE	AGENCY	CODE		12	80015.0	-.595E+04	.000000	80020.0	80010.0	81/04/28	82/03/04
00076	TURB	TRBIDMTR	HACH FTU		12	10.3333	134.242	11.5863	45.0000	1.00000	81/04/28	82/03/04
00080	COLOR	PT-CO	UNITS		12	42.4998	147.739	12.1548	60.0000	20.0000	81/04/28	82/03/04
00095	CNDUCTVY	AT 25C	MICROMHO		12	4286.66	2138884	1462.49	6740.00	1990.00	81/04/28	82/03/04
00300	DO		MG/L		12	7.98333	11.7489	3.42766	13.1000	2.60000	81/04/28	82/03/04
00310	BOD	5 DAY	MG/L		12	5.14166	6.01536	2.45262	9.40000	.800000	81/04/28	82/03/04
00339	COD MUD	DRY WGT	MG/KG		1	330000			330000	330000	81/07/20	81/07/20
00340	COD	HI LEVEL	MG/L		11	134.091	11575.3	107.589	440.000	54.0000	81/04/28	82/03/04
				K	1	10.0000			10.0000	10.0000	81/12/17	81/12/17
				TOT	12	123.750	11806.2	108.656	440.000	10.0000	81/04/28	82/03/04
00400	PH		SU		12	7.35833	.128152	.357983	7.80000	6.70000	81/04/28	82/03/04
00403	LAB	PH	SU		10	7.28000	.075114	.274069	7.70000	6.90000	81/04/28	82/01/27
00410	T ALK	CACO3	MG/L		12	85.3332	716.244	26.7627	149.000	43.0000	81/04/28	82/03/04
00496	LOSS ON	IGNITION	MG/KG		1	295000			295000	295000	81/07/20	81/07/20
00530	RESIDUE	TOT NFLT	MG/L		12	31.0833	419.905	20.4916	85.0000	15.0000	81/04/28	82/03/04
00557	OIL-GRSE	MUD FRGR	MG/KG		1	.000000			.000000	.000000	81/07/20	81/07/20
00602	DISS.	NITROGEN	MG/L N		12	3.93333	26.3896	5.13708	20.0000	1.40000	81/04/28	82/03/04
00607	ORG N	DISS-N	MG/L		12	2.85749	29.3210	5.41489	20.0000	.770001	81/04/28	82/03/04
00608	NH3+NH4-	N DISS	MG/L		12	.714166	.774845	.880253	2.30000	.060000	81/04/28	82/03/04
00611	NH3 MUD	DRY WGT	MG/KG-N		1	380.000			380.000	380.000	81/07/20	81/07/20
00623	KJELDL N	DISS	MG/L		12	3.53749	27.8567	5.27795	20.0000	.910001	81/04/28	82/03/04
00626	ORGAN. N	MUD D WT	MG/KG-N		1	7700.00			7700.00	7700.00	81/07/20	81/07/20
00630	NO2&NO3	N-TOTAL	MG/L		1	.030000			.030000	.030000	81/05/19	81/05/19
00631	NO2&NO3	N-DISS	MG/L		12	.408333	.105543	.324873	.970001	.000000	81/04/28	82/03/04
00665	PHOS-TOT		MG/L P		12	.721667	.379670	.616173	2.10000	.160000	81/04/28	82/03/04
00721	CYANIDE	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
00900	TOT HARD	CACO3	MG/L		12	466.666	17679.5	132.964	670.000	240.000	81/04/28	82/03/04
00902	NC HARD	CACO3	MG/L		11	406.363	17666.0	132.914	630.000	230.000	81/05/19	82/03/04
00915	CALCIUM	CA,DISS	MG/L		12	58.0000	40.1882	6.33942	68.0000	45.0000	81/04/28	82/03/04
00925	MGNSIUM	MG,DISS	MG/L		12	78.3332	902.250	30.0042	130.000	32.0000	81/04/28	82/03/04
00930	SODIUM	NA,DISS	MG/L		12	714.999	81683.6	285.803	1200.00	280.000	81/04/28	82/03/04
00931	SODIUM	ADSBTION	RATIO		12	13.8500	13.1208	3.62227	19.0000	7.80000	81/04/28	82/03/04
00932	PERCENT	SODIUM	%		12	74.9166	7.18750	2.68095	77.0000	70.0000	81/04/28	82/03/04
00935	PTSSIUM	K,DISS	MG/L		12	24.1666	150.516	12.2685	56.0000	10.0000	81/04/28	82/03/04
00940	CHLORIDE	TOTAL	MG/L		12	1256.67	258678	508.604	2100.00	480.000	81/04/28	82/03/04
00945	SULFATE	SO4-TOT	MG/L		12	178.333	2596.98	50.9606	280.000	100.000	81/04/28	82/03/04
00950	FLUORIDE	F,DISS	MG/L		12	.266666	.009697	.098475	.500000	.100000	81/04/28	82/03/04
00955	SILICA	DISOLVED	MG/L		12	4.35000	4.67186	2.16145	7.00000	.100000	81/04/28	82/03/04
01000	ARSENIC	AS,DISS	UG/L		4	2.00000	3.33333	1.82574	4.00000	.000000	81/04/28	82/01/27
01003	ARSENIC	SEDMG/KG	DRY WGT		1	9.00000			9.00000	9.00000	81/07/20	81/07/20

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BAYOU SEGNETTE 4.6 MILES SOUTH OF WESTWEGO,LA
22051 LOUISIANA JEFFERSON

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624147-0289496

TYPA AMBNT/STREAM

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
01010 BERYLIUM	BE,DISS	UG/L		2	5.00000	50.0000	7.07107	10.0000	.000000	81/04/28	81/07/20
			K	2	10.0000	.000000	.000000	10.0000	10.0000	81/10/22	82/01/27
			TOT	4	7.50000	25.0000	5.00000	10.0000	.000000	81/04/28	82/01/27
01013 BERYLIUM	SEDMG/KG	DRY WGT		1	1.00000			1.00000	1.00000	81/07/20	81/07/20
01025 CADMIUM	CD,DISS	UG/L		4	.750000	.250000	.500000	1.00000	.000000	81/04/28	82/01/27
01028 CD MUD	DRY WGT	MG/KG-CD		1	2.00000			2.00000	2.00000	81/07/20	81/07/20
01029 CHROMIUM	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
01030 CHROMIUM	CR,DISS	UG/L		4	7.50000	25.0000	5.00000	10.0000	.000000	81/04/28	82/01/27
01032 CHROMIUM	HEX-VAL	UG/L		1	.000000			.000000	.000000	81/07/20	81/07/20
			K	2	1.00000	.000000	.000000	1.00000	1.00000	81/10/22	82/01/27
			TOT	3	.666667	.333334	.577351	1.00000	.000000	81/07/20	82/01/27
01040 COPPER	CU,DISS	UG/L		4	4.75000	2.91667	1.70782	7.00000	3.00000	81/04/28	82/01/27
01043 COPPER	SEDMG/KG	DRY WGT		1	21.0000			21.0000	21.0000	81/07/20	81/07/20
01046 IRON	FE,DISS	UG/L		6	34.1667	204.166	14.2887	50.0000	10.0000	81/04/28	82/03/04
01049 LEAD	PB,DISS	UG/L		4	1.25000	.916667	.957427	2.00000	.000000	81/04/28	82/01/27
01052 LEAD	SEDMG/KG	DRY WGT		1	30.0000			30.0000	30.0000	81/07/20	81/07/20
01053 MN MUD	DRY WGT	MG/KG-MN		1	960.000			960.000	960.000	81/07/20	81/07/20
01056 MANGNESE	MN,DISS	UG/L		6	11.6667	376.667	19.4079	50.0000	.000000	81/04/28	82/03/04
01065 NICKEL	NI,DISS	UG/L		4	2.50000	6.33333	2.51661	6.00000	.000000	81/04/28	82/01/27
01068 NICKEL	SEDMG/KG	DRY WGT		1	20.0000			20.0000	20.0000	81/07/20	81/07/20
01090 ZINC	ZN,DISS	UG/L		4	17.5000	91.6667	9.57427	30.0000	10.0000	81/04/28	82/01/27
01093 ZINC	SEDMG/KG	DRY WGT		1	100.000			100.000	100.000	81/07/20	81/07/20
01145 SELENIUM	SE,DISS	UG/L		2	.000000	.000000	.000000	.000000	.000000	81/04/28	81/07/20
			K	2	1.00000	.000000	.000000	1.00000	1.00000	81/10/22	82/01/27
			TOT	4	.500000	.333333	.577350	1.00000	.000000	81/04/28	82/01/27
01148 SELENIUM	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
31625 FEC COLI	M-FCAGAD	/100 ML		6	281.666	28016.8	167.382	540.000	120.000	81/04/28	82/01/27
			B	6	1332.50	9731094	3119.47	7700.00	40.0000	81/07/01	82/03/04
			TOT	12	807.082	4737117	2176.49	7700.00	40.0000	81/04/28	82/03/04
31673 FECSTREP	MFKFAGAR	/100ML		10	1992.00	3483377	1866.38	4600.00	240.000	81/05/19	82/03/04
			B	2	2095.00	8040063	2835.50	4100.00	90.0000	81/04/28	82/02/24
			TOT	12	2009.16	3582557	1892.76	4600.00	90.0000	81/04/28	82/03/04
39034 PERTHANE	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39250 NAPTHAL	ENES, PC	. UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39251 PCNS	MUD	UG/KG	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39330 ALDRIN		TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39333 ALDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39340 GAMMABHC	LINDANE	TOT.UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39343 GBHC-MUD	LINDANE	DRYUG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39350 CHLRDANE	TECH&MET	TOT UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39351 CDANEDRY	TECH&MET	MUDUG/KG		1	13.0000			13.0000	13.0000	81/07/20	81/07/20

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BAYOU SEGNETTE 4.6 MILES SOUTH OF WESTWEGO,LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624147-0289496

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39360	DDD	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39363	DDD	MUD	UG/KG		1	1.50000			1.50000	1.50000	81/07/20	81/07/20
39365	DDE	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39368	DDE	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39370	DDT	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39373	DDT	MUD	UG/KG		1	1.20000			1.20000	1.20000	81/07/20	81/07/20
39380	DIELDRIN		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39383	DIELDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39388	ENDOSULN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39389	ENDOSULN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39390	ENDRIN		TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39393	ENDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39398	ETHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39399	ETHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39400	TOXAPHEN		TOTUG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39403	TOXAPHEN	SEDUG/KG	DRY WGT	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39410	HEPTCHLR		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39413	HEPTCHLR	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39420	HPCHLREP		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39423	HPCHLREP	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39480	MTHXYCLR	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39481	MTHXYCLR	MUD DRY	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39516	PCBS	WHL SMPL	UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39519	PCBS	MUD	UG/KG	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39530	MALATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39531	MALATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39540	PARATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39541	PARATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39570	DIAZINON	WHL SMPL	UG/L		4	.035000	.000833	.028868	.060000	.010000	81/04/28	82/01/27
39571	DIAZINON	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39600	MPARATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39601	MPARATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39730	2,4-D	WHL SMPL	UG/L		4	.062500	.000425	.020616	.080000	.040000	81/04/28	82/01/27
39740	2,4,5-T	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39755	MIREX	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39758	MIREX	BOT MAT	UG/KG	K	1	.100000			.100000	.1000[illegible]	[illegible] 20	81/07/20
39760	SILVEX	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.0100[illegible]	[illegible] 28	82/01/27
39786	TRITHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.0100[illegible]	81/[illegible] 28	82/01/27
39787	TRITHION	MUD	UG/KG	K	1	.100000			.100000	.1000[illegible]	81/[illegible] 20	81/07/20
39790	MTRTHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.0100[illegible]	[illegible] 28	82/01/27
39791	MTRTHION	MUD	UG/KG	K	1	.100000			.100000	.100000	8[illegible] 20	81/07/20

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BAYOU SEGNETTE 4.6 MILES SOUTH OF WESTWEGO,LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624147-0289496

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
60050	ALGAE	TOTAL	/ML		4	561975	.614E+12	784176	1700000	7900.00	81/04/28	82/01/27
70300	RESIDUE	DISS-180	C MG/L		12	2452.50	788582	888.021	3960.00	1090.00	81/04/28	82/03/04
70301	DISS SOL	SUM	MG/L		12	2363.33	761660	872.731	3810.00	1010.00	81/04/28	82/03/04
70303	DISS SOL	TONS PER	ACRE-FT		12	3.33500	1.46269	1.20942	5.39000	1.48000	81/04/28	82/03/04
71846	AMMONIA	DISS-NH4	MG/L		12	.925000	1.30869	1.14398	3.00000	.080000	81/04/28	82/03/04
71886	TOTAL P	AS PO4	MG/L		12	2.21583	3.53732	1.88078	6.40000	.490000	81/04/28	82/03/04
71890	MERCURY	HG,DISS	UG/L		2	1.05000	.845002	.919240	1.70000	.400000	81/04/28	81/07/20
				K	2	.100000	-.372E-08	.000000	.100000	.100000	81/10/22	82/01/27
				TOT	4	.575000	.582501	.763217	1.70000	.100000	81/04/28	82/01/27
71921	MERCURY	SEDMG/KG	DRY WGT		1	.040000			.040000	.040000	81/07/20	81/07/20
81886	PERTHANE	SED DRY	WGTUG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
82068	POTAS-40	K-40,DIS	PC/LITER		4	16.1250	51.0625	7.14580	25.0000	7.50000	81/04/28	81/07/20
82183	2,4-DP	DICLPROP	TOT UG/L		1	.010000			.010000	.010000	81/07/20	81/07/20
				K	3	.010000	.000000	.000000	.010000	.010000	81/04/28	82/01/27
				TOT	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
85209	ALGAL	GRO PNTL	MG/L		3	4.46667	23.4533	4.84286	10.0000	1.00000	81/04/28	81/10/22

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KENTA CANAL NEAR CROWN POINT, LA
22051 LOUISIANA JEFFERSON

TYPA AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624136-0289313

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		11	23.1818	53.3121	7.30151	34.0000	12.5000	81/04/28	82/03/04
00028	ANALYZE	AGENCY	CODE		11	80014.5	6553.60	80.9543	80020.0	80010.0	81/04/28	82/03/04
00076	TURB	TRBIDMTR	HACH FTU		11	3.81818	3.76364	1.94001	8.00000	1.00000	81/04/28	82/03/04
00080	COLOR	PT-CO	UNITS		11	72.7271	521.841	22.8438	100.0000	20.0000	81/04/28	82/03/04
00095	CNDUCTVY	AT 25C	MICROMHO		11	2850.91	1782249	1335.01	5260.00	1430.00	81/04/28	82/03/04
00300	DO		MG/L		11	5.69090	6.52095	2.55361	9.60000	1.60000	81/04/28	82/03/04
00310	BOD	5 DAY	MG/L		11	4.84545	10.6468	3.26294	9.60000	.700000	81/04/28	82/03/04
00339	COD MUD	DRY WGT	MG/KG		1	[illegible]2000.0			92000.0	92000.0	81/07/20	81/07/20
00340	COD	HI LEVEL	MG/L		10	115.000	3094.44	55.6277	250.000	57.0000	81/04/28	82/03/04
				K	1	10.0000			10.0000	10.0000	81/12/17	81/12/17
				TOT	11	105.455	3787.28	61.5409	250.000	10.0000	81/04/28	82/03/04
00400	PH		SU		11	6.69090	.142944	.378080	7.50000	6.10000	81/04/28	82/03/04
00403	LAB	PH	SU		9	7.22222	.021942	.148129	7.50000	7.00000	81/04/28	82/01/27
00410	T ALK	CACO3	MG/L		11	74.9999	185.412	13.6166	95.0000	52.0000	81/04/28	82/03/04
00496	LOSS ON	IGNITION	MG/KG		1	148000			148000	148000	81/07/20	81/07/20
00530	RESIDUE	TOT NFLT	MG/L		11	9.81818	24.9637	4.99637	17.0000	1.00000	81/04/28	82/03/04
00557	OIL-GRSE	MUD FRGR	MG/KG		1	.000000			.000000	.000000	81/07/20	81/07/20
00602	DISS.	NITROGEN	MG/L N		10	3.16999	23.7290	4.87124	17.0000	1.00000	81/04/28	82/03/04
00607	ORG N	DISS-N	MG/L		10	2.93399	24.5263	4.95241	17.0000	.810001	81/04/28	82/03/04
00608	NH3+NH4-	N DISS	MG/L		10	.182000	.016618	.128910	.510000	.050000	81/04/28	82/03/04
00611	NH3 MUD	DRY WGT	MG/KG-N		1	230.000			230.000	230.000	81/07/20	81/07/20
00623	KJELDL N	DISS	MG/L		10	3.09800	23.9671	4.89562	17.0000	.980001	81/04/28	82/03/04
00626	ORGAN. N	MUD D WT	MG/KG-N		1	1900.00			1900.00	1900.00	81/07/20	81/07/20
00630	NO2&NO3	N-TOTAL	MG/L		1	.050000			.050000	.050000	81/05/19	81/05/19
00631	NO2&NO3	N-DISS	MG/L		10	.082000	.002196	.046857	.150000	.030000	81/04/28	82/03/04
00665	PHOS-TOT		MG/L P		11	.434545	.077807	.278939	1.10000	.210000	81/04/28	82/03/04
00721	CYANIDE	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
00900	TOT HARD	CACO3	MG/L		11	309.091	16048.9	126.684	520.000	180.000	81/04/28	82/03/04
00902	NC HARD	CACO3	MG/L		11	230.909	16949.1	130.189	460.000	110.000	81/04/28	82/03/04
00915	CALCIUM	CA,DISS	MG/L		11	41.0000	135.204	11.6277	59.0000	24.0000	81/04/28	82/03/04
00925	MGNSIUM	MG,DISS	MG/L		11	49.9090	615.301	24.8052	93.0000	26.0000	81/04/28	82/03/04
00930	SODIUM	NA,DISS	MG/L		11	459.999	53700.9	231.735	840.000	210.000	81/04/28	82/03/04
00931	SODIUM	ADSBTION	RATIO		11	11.1636	11.1066	3.33265	16.0000	6.90000	81/04/28	82/03/04
00932	PERCENT	SODIUM	%		11	74.6363	5.86406	2.42159	77.0000	70.0000	81/04/28	82/03/04
00935	PTSSIUM	K,DISS	MG/L		11	13.7727	52.7803	7.26593	28.0000	7.40000	81/04/28	82/03/04
00940	CHLORIDE	TOTAL	MG/L		11	830.908	179451	423.617	1600.00	390.000	81/[illegible]/28	82/03/04
00945	SULFATE	SO4-TOT	MG/L		11	67.5090	3554.53	59.6199	210.000	6.60000	81/[illegible]4/28	82/03/04
00950	FLUORIDE	F,DISS	MG/L		11	.218182	.011636	.107872	.500000	.100000	81/[illegible]/28	82/03/04
00955	SILICA	DISOLVED	MG/L		11	6.48182	12.1996	3.49280	14.0000	1.50000	[illegible]/28	82/03/04
01000	ARSENIC	AS,DISS	UG/L		4	1.50000	1.66667	1.29099	3.00000	.000000	[illegible]	82/[illegible]
01003	ARSENIC	SEDMG/KG	DRY WGT		1	5.00000			5.00000	5.00000	[illegible]20	81/[illegible]

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KENTA CANAL NEAR CROWN POINT, LA
22051 LOUISIANA JEFFERSON

TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624136-0289313

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
01010 BERYLIUM	BE,DISS	UG/L		3	3.66667	30.3333	5.50757	10.00000	.000000	81/04/28	81/10/22
			K	1	1.00000			1.00000	1.00000	82/01/27	82/01/27
			TOT	4	3.00000	22.0000	4.69042	10.00000	.000000	81/04/28	82/01/27
01013 BERYLIUM	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
01025 CADMIUM	CD,DISS	UG/L		2	1.00000	.000000	.000000	1.00000	1.00000	81/07/20	81/10/22
			K	2	1.00000	.000000	.000000	1.00000	1.00000	81/04/28	82/01/27
			TOT	4	1.00000	.000000	.000000	1.00000	1.00000	81/04/28	82/01/27
01028 CD MUD	DRY WGT	MG/KG-CD		1	2.00000			2.00000	2.00000	81/07/20	81/07/20
01029 CHROMIUM	SEDMG/KG	DRY WGT		1	10.0000			10.0000	10.0000	81/07/20	81/07/20
01030 CHROMIUM	CR,DISS	UG/L		4	10.0000	66.6667	8.16497	20.0000	.000000	81/04/28	82/01/27
01032 CHROMIUM	HEX-VAL	UG/L		1	.000000			.000000	.000000	81/07/20	81/07/20
			K	2	1.00000	.000000	.000000	1.00000	1.00000	81/10/22	82/01/27
			TOT	3	.666667	.333334	.577351	1.00000	.000000	81/07/20	82/01/27
01040 COPPER	CU,DISS	UG/L		4	3.75000	.250000	.500000	4.00000	3.00000	81/04/28	82/01/27
01043 COPPER	SEDMG/KG	DRY WGT		1	29.0000			29.0000	29.0000	81/07/20	81/07/20
01046 IRON	FE,DISS	UG/L		6	128.333	6656.67	81.5884	220.000	50.0000	81/04/28	82/03/04
01049 LEAD	PB,DISS	UG/L		4	1.50000	.333333	.577350	2.00000	1.00000	81/04/28	82/01/27
01052 LEAD	SEDMG/KG	DRY WGT		1	20.0000			20.0000	20.0000	81/07/20	81/07/20
01053 MN MUD	DRY WGT	MG/KG-MN		1	170.000			170.000	170.000	81/07/20	81/07/20
01056 MANGNESE	MN,DISS	UG/L		6	206.667	10186.7	100.929	350.000	110.000	81/04/28	82/03/04
01065 NICKEL	NI,DISS	UG/L		4	1.75000	.916667	.957427	3.00000	1.00000	81/04/28	82/01/27
01068 NICKEL	SEDMG/KG	DRY WGT		1	30.0000			30.0000	30.0000	81/07/20	81/07/20
01090 ZINC	ZN,DISS	UG/L		4	23.5000	62.3333	7.89515	30.0000	14.0000	81/04/28	82/01/27
01093 ZINC	SEDMG/KG	DRY WGT		1	85.0000			85.0000	85.0000	81/07/20	81/07/20
01145 SELENIUM	SE,DISS	UG/L		2	.000000	.000000	.000000	.000000	.000000	81/04/28	81/07/20
			K	2	1.00000	.000000	.000000	1.00000	1.00000	81/10/22	82/01/27
			TOT	4	.500000	.333333	.577350	1.00000	.000000	81/04/28	82/01/27
01148 SELENIUM	SEDMG/KG	DRY WGT		1	1.00000			1.00000	1.00000	81/07/20	81/07/20
31625 FEC COLI	M-FCAGAD	/100 ML		3	160.000	1900.06	43.5897	190.000	110.000	81/08/06	82/01/27
			B	7	51.2856	1673.58	40.9094	110.000	2.00000	81/04/28	82/03/04
			K	1	10.00000			10.00000	10.00000	81/10/22	81/10/22
			TOT	11	77.1817	4362.56	66.0497	190.000	2.00000	81/04/28	82/03/04
31673 FECSTREP	MFKFAGAR	/100ML		7	2092.86	2211898	1487.25	4600.00	190.000	81/07/01	82/02/24
			B	4	1112.50	570628	755.399	1700.00	50.0000	81/04/28	82/03/04
			TOT	11	1736.36	1742969	1320.22	4600.00	50.0000	81/04/28	82/03/04
39034 PERTHANE	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39250 NAPTHAL	ENES, PC	. UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39251 PCNS	MUD	UG/KG	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39330 ALDRIN		TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39333 ALDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39340 GAMMABHC	LINDANE	TOT.UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27

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KENTA CANAL NEAR CROWN POINT, LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624136-0289313

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39343	GBHC-MUD	LINDANE	DRYUG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39350	CHLRDANE	TECH&MET	TOT UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39351	CDANEDRY	TECH&MET	MUDUG/KG		1	8.00000			8.00000	8.00000	81/07/20	81/07/20
39360	DDD	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39363	DDD	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39365	DDE	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39368	DDE	MUD	UG/KG		1	.200000			.200000	.200000	81/07/20	81/07/20
39370	DDT	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39373	DDT	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39380	DIELDRIN		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39383	DIELDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39388	ENDOSULN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39389	ENDOSULN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39390	ENDRIN		TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39393	ENDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39398	ETHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39399	ETHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39400	TOXAPHEN		TOTUG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39403	TOXAPHEN	SEDUG/KG	DRY WGT	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39410	HEPTCHLR		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39413	HEPTCHLR	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39420	HPCHLREP		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39423	HPCHLREP	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39480	MTHXYCLR	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39481	MTHXYCLR	MUD DRY	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39516	PCBS	WHL SMPL	UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39519	PCBS	MUD	UG/KG	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39530	MALATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39531	MALATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39540	PARATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39541	PARATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39570	DIAZINON	WHL SMPL	UG/L		2	.015000	.000050	.007071	.020000	.010000	81/04/28	81/10/22
				K	2	.010000	.000000	.000000	.010000	.010000	81/07/20	82/01/27
				TOT	4	.012500	.000025	.005000	.020000	.010000	81/04/28	82/01/27
39571	DIAZINON	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39600	MPARATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39601	MPARATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39730	2,4-D	WHL SMPL	UG/L		3	.033333	.000633	.025166	.060000	.010000	81/04/28	81/10/22
				K	1	.010000			.010000	.010000	82/01/27	82/01/27
				TOT	4	.027500	.000558	.023629	.060000	.010000	81/04/28	82/01/27
39740	2,4,5-T	WHL SMPL	UG/L		1	.010000			.010000	.010000	81/10/22	81/10/22

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KENTA CANAL NEAR CROWN POINT, LA
22051 LOUISIANA JEFFERSON

TYPA AMBNT STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624136-0289313

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39740 2,4,5-T	WHL SMPL	UG/L	K	3	.010000	.000000	.000000	.010000	.010000	81/04/28	82/01/27
			TOT	4	.010000-	.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39755 MIREX	WHL SMPL	UG/L	K	4	.010000-	.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39758 MIREX	BOT MAT	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39760 SILVEX	WHL SMPL	UG/L	K	4	.010000-	.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39786 TRITHION	WHL SMPL	UG/L	K	4	.010000-	.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39787 TRITHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39790 MTRTHION	WHL SMPL	UG/L	K	4	.010000-	.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39791 MTRTHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
60050 ALGAE	TOTAL	/ML		4	72875.0	.675E+10	82162.8	190000	6500.00	81/04/28	82/01/27
70300 RESIDUE	DISS-180	C MG/L		11	1605.73	578211	760.402	2890.00	792.000	81/04/28	82/03/04
70301 DISS SOL	SUM	MG/L		11	1514.18	555883	745.576	2770.00	710.000	81/04/28	82/03/04
70303 DISS SOL	TONS PER	ACRE-FT		11	2.18272	1.06906	1.03395	3.93000	1.08000	81/04/28	82/03/04
71846 AMMONIA	DISS-NH4	MG/L		10	.234000	.028116	.167677	.660001	.060000	81/04/28	82/03/04
71886 TOTAL P	AS PO4	MG/L		11	1.33091	.747086	.864341	3.40000	.640001	81/04/28	82/03/04
71890 MERCURY	HG,DISS	UG/L		3	.133333	.003333	.057735	.200000	.100000	81/04/28	81/10/22
			K	1	.100000			.100000	.100000	82/01/27	82/01/27
			TOT	4	.125000	.002500	.050000	.200000	.100000	81/04/28	82/01/27
71921 MERCURY	SEDMG/KG	DRY UGT		1	.050000			.050000	.050000	81/07/20	81/07/20
81886 PERTHANE	SED DRY	UGTUG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
82068 POTAS-40	K-40,DIS	PC/LITER		4	9.57500	34.0559	5.83574	18.0000	5.50000	81/04/28	81/07/20
82183 2,4-DP	DICLPROP	TOT UG/L	K	4	.010000-	.776E-10	.000000	.010000	.010000	81/04/28	82/01/27

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BAYOU SEGNETTE NEAR BARATARIA, LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624120-0289105

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT		12	23.8750	52.2326	7.22721	36.0000	13.0000	81/04/28	82/03/04
00028 ANALYZE	AGENCY	CODE		12	80015.0-	.595E+04	.000000	80020.0	80010.0	81/04/28	82/03/04
00076 TURB	TRBIDMTR	HACH FTU		12	10.0833	53.1742	7.29207	30.0000	4.00000	81/04/28	82/03/04
00080 COLOR	PT-CO	UNITS		12	40.8332	790.161	28.1098	120.000	20.0000	81/04/28	82/03/04
00095 CNDUCTVY	AT 25C	MICROMHO		12	5547.50	3501265	1871.17	8770.00	3040.00	81/04/28	82/03/04
00300 DO		MG/L		12	7.50833	6.15359	2.48064	12.3000	4.10000	81/04/28	82/03/04
00310 BOD	5 DAY	MG/L		12	2.60833	1.81902	1.34871	4.80000	.500000	81/04/28	82/03/04
00339 COD MUD	DRY WGT	MG/KG		1	340000			340000	340000	81/07/20	81/07/20
00340 COD	HI LEVEL	MG/L		12	144.917	4922.82	70.1628	340.000	75.0000	81/04/28	82/03/04
00400 PH		SU		12	7.07499	.083918	.289686	7.50000	6.60000	81/04/28	82/03/04
00403 LAB	PH	SU		10	7.27999	.017388	.131864	7.40000	7.10000	81/04/28	82/01/27
00410 T ALK	CACO3	MG/L		12	64.8333	188.524	13.7304	92.0000	43.0000	81/04/28	82/03/04
00496 LOSS ON	IGNITION	MG/KG		1	292000			292000	292000	81/07/20	81/07/20
00530 RESIDUE	TOT NFLT	MG/L		12	33.1666	580.881	24.1015	89.0000	4.00000	81/04/28	82/03/04
00557 OIL-GRSE	MUD FRGR	MG/KG		1	.000000			.000000	.000000	81/07/20	81/07/20
00602 DISS.	NITROGEN	MG/L N		12	3.60833	41.4208	6.43590	24.0000	1.10000	81/04/28	82/03/04
00607 ORG N	DISS-N	MG/L		12	2.98416	39.8691	6.31420	23.0000	.650001	81/04/28	82/03/04
00608 NH3+NH4-	N DISS	MG/L		12	.233333	.054152	.232705	.770001	.050000	81/04/28	82/03/04
00611 NH3 MUD	DRY WGT	MG/KG-N		1	210.000			210.000	210.000	81/07/20	81/07/20
00623 KJELDL N	DISS	MG/L		12	3.24833	42.8495	6.54595	24.0000	.700001	81/04/28	82/03/04
00626 ORGAN. N	MUD D WT	MG/KG-N		1	6800.00			6800.00	6800.00	81/07/20	81/07/20
00630 NO2&NO3	N-TOTAL	MG/L		1	.040000			.040000	.040000	81/05/19	81/05/19
00631 NO2&NO3	N-DISS	MG/L		12	.365833	.148790	.385733	1.20000	.040000	81/04/28	82/03/04
00665 PHOS-TOT		MG/L P		12	.204166	.014518	.120489	.400000	.070000	81/04/28	82/03/04
00721 CYANIDE	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
00900 TOT HARD	CACO3	MG/L		12	561.665	33143.9	182.055	840.000	330.000	81/04/28	82/03/04
00902 NC HARD	CACO3	MG/L		12	486.666	31570.6	177.681	780.000	250.000	81/04/28	82/03/04
00915 CALCIUM	CA,DISS	MG/L		12	58.1666	75.0714	8.66437	70.0000	45.0000	81/04/28	82/03/04
00925 MGNSIUM	MG,DISS	MG/L		12	100.333	1523.52	39.0323	160.000	52.0000	81/04/28	82/03/04
00930 SODIUM	NA,DISS	MG/L		12	923.332	142990	378.140	1600.00	440.000	81/04/28	82/03/04
00931 SODIUM	ADSBTION	RATIO		12	16.5000	18.6366	4.31702	24.0000	10.0000	81/04/28	82/03/04
00932 PERCENT	SODIUM	%		12	76.0832	4.46591	2.11327	79.0000	72.0000	81/04/28	82/03/04
00935 PTSSIUM	K,DISS	MG/L		12	30.7499	134.753	11.6083	54.0000	20.0000	81/04/28	82/03/04
00940 CHLORIDE	TOTAL	MG/L		12	1658.33	473690	688.251	2900.00	770.000	81/04/28	82/03/04
00945 SULFATE	SO4-TOT	MG/L		12	217.917	8597.55	92.7230	380.000	75.0000	81/[illegible]/28	82/03/04
00950 FLUORIDE	F,DISS	MG/L		12	.275000	.007500	.086604	.400000	.2000[illegible]	[illegible]4 28	82/03/04
00955 SILICA	DISOLVED	MG/L		12	4.13333	5.08246	2.25443	9.30000	.5000[illegible]0	[illegible] 28	82/03/04
01000 ARSENIC	AS,DISS	UG/L		3	1.66667	2.33334	1.52753	3.00000	.000000	81 04/28	82/01/27
01003 ARSENIC	SEDMG/KG	DRY WGT		1	9.00000			9.00000	9.000[illegible]0	[illegible]/20	81/07/20
01010 BERYLIUM	BE,DISS	UG/L		2	5.00000	50.0000	7.07107	10.0000	.0000[illegible]0	[illegible]/28	81/07/20
			K	1	10.0000			10.0000	10.0030	82/[illegible]/27	82/01/27

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BAYOU SEGNETTE NEAR BARATARIA, LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624120-0289105

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
01010 BERYLIUM	BE,DISS	UG/L	TOT	3	6.66667	33.3334	5.77351	10.0000	.000000	81/04/28	82/01/27
01013 BERYLIUM	SEDMG/KG	DRY WGT		1	2.00000			2.00000	2.00000	81/07/20	81/07/20
01025 CADMIUM	CD,DISS	UG/L		2	.500000	.500000	.707107	1.00000	.000000	81/04/28	81/07/20
			K	1	1.00000			1.00000	1.00000	82/01/27	82/01/27
			TOT	3	.666667	.333334	.577351	1.00000	.000000	81/04/28	82/01/27
01028 CD MUD	DRY WGT	MG/KG-CD		1	1.00000			1.00000	1.00000	81/07/20	81/07/20
01029 CHROMIUM	SEDMG/KG	DRY WGT		1	7.00000			7.00000	7.00000	81/07/20	81/07/20
01030 CHROMIUM	CR,DISS	UG/L		2	10.0000	200.000	14.1421	20.0000	.000000	81/04/28	81/07/20
			K	1	10.0000			10.0000	10.0000	82/01/27	82/01/27
			TOT	3	10.0000	100.000	10.0000	20.0000	.000000	81/04/28	82/01/27
01032 CHROMIUM	HEX-VAL	UG/L		1	.000000			.000000	.000000	81/07/20	81/07/20
			K	1	1.00000			1.00000	1.00000	82/01/27	82/01/27
			TOT	2	.500000	.500000	.707107	1.00000	.000000	81/07/20	82/01/27
01040 COPPER	CU,DISS	UG/L		2	3.00000	2.00000	1.41421	4.00000	2.00000	81/07/20	82/01/27
01043 COPPER	SEDMG/KG	DRY WGT		1	21.0000			21.0000	21.0000	81/07/20	81/07/20
01046 IRON	FE,DISS	UG/L		4	49.7500	986.916	31.4152	80.0000	10.0000	81/04/28	82/03/04
			K	1	10.0000			10.0000	10.0000	82/01/27	82/01/27
			TOT	5	41.8000	1056.20	32.4992	80.0000	10.0000	81/04/28	82/03/04
01049 LEAD	PB,DISS	UG/L		3	1.33333	.333335	.577352	2.00000	1.00000	81/04/28	82/01/27
01052 LEAD	SEDMG/KG	DRY WGT		1	20.0000			20.0000	20.0000	81/07/20	81/07/20
01053 MN MUD	DRY WGT	MG/KG-MN		1	510.000			510.000	510.000	81/07/20	81/07/20
01056 MANGNESE	MN,DISS	UG/L		5	53.1999	817.205	28.5868	80.0000	10.0000	81/04/28	82/03/04
01065 NICKEL	NI,DISS	UG/L		3	1.66667	2.33334	1.52753	3.00000	.000000	81/04/28	82/01/27
01068 NICKEL	SEDMG/KG	DRY WGT		1	20.0000			20.0000	20.0000	81/07/20	81/07/20
01090 ZINC	ZN,DISS	UG/L		3	16.6667	33.3339	5.77355	20.0000	10.0000	81/04/28	82/01/27
01093 ZINC	SEDMG/KG	DRY WGT		1	96.0000			96.0000	96.0000	81/07/20	81/07/20
01145 SELENIUM	SE,DISS	UG/L		2	.000000	.000000	.000000	.000000	.000000	81/04/28	81/07/20
			K	1	1.00000			1.00000	1.00000	82/01/27	82/01/27
			TOT	3	.333333	.333333	.577350	1.00000	.000000	81/04/28	82/01/27
01148 SELENIUM	SEDMG/KG	DRY WGT		1	.000000			.000000	.000000	81/07/20	81/07/20
31625 FEC COLI	M-FCAGAD	/100 ML		2	255.000	42049.9	205.061	400.000	110.000	81/12/17	82/01/27
			B	10	62.5998	9916.45	99.5814	340.000	6.00000	81/04/28	82/03/04
			TOT	12	94.6665	17544.9	132.457	400.000	6.00000	81/04/28	82/03/04
31673 FECSTREP	MFKFAGAR	/100ML		9	2395.55	.126E+08	3551.20	9800.00	190.000	81/05/19	82/03/04
			B	3	2473.33	7404136	2721.05	5400.00	20.0000	81/04/28	81/09/01
			TOT	12	2415.00	.105E+08	3243.31	9800.00	20.0000	81/04/28	82/03/04
39034 PERTHANE	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39250 NAPTHAL	ENES, PC	. UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39251 PCNS	MUD	UG/KG	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39330 ALDRIN		TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39333 ALDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20

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BAYOU SEGNETTE NEAR BARATARIA, LA
22051 LOUISIANA JEFFERSON

/TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624120-0289105

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39340	GAMMABHC	LINDANE	TOT.UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39343	GBHC-MUD	LINDANE	DRYUG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39350	CHLRDANE	TECH&MET	TOT UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39351	CDANEDRY	TECH&MET	MUDUG/KG		1	8.00000			8.00000	8.00000	81/07/20	81/07/20
39360	DDD	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39363	DDD	MUD	UG/KG		1	2.70000			2.70000	2.70000	81/07/20	81/07/20
39365	DDE	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39368	DDE	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39370	DDT	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39373	DDT	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39380	DIELDRIN		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39383	DIELDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39388	ENDOSULN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39389	ENDOSULN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39390	ENDRIN		TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39393	ENDRIN	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39398	ETHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39399	ETHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39400	TOXAPHEN		TOTUG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39403	TOXAPHEN	SEDUG/KG	DRY WGT	K	1	1.00000			1.00000	1.00000	81/07/20	81/07/20
39410	HEPTCHLR		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39413	HEPTCHLR	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39420	HPCHLREP		TOTUG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39423	HPCHLREP	SEDUG/KG	DRY WGT	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39480	MTHXYCLR	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39481	MTHXYCLR	MUD DRY	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39516	PCBS	WHL SMPL	UG/L	K	4	.100000	-.372E-08	.000000	.100000	.100000	81/04/28	82/01/27
39519	PCBS	MUD	UG/KG		1	14.0000			14.0000	14.0000	81/[illegible]/20	81/07/20
39530	MALATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39531	MALATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39540	PARATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39541	PARATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39570	DIAZINON	WHL SMPL	UG/L		3	.020000	.000000	.000000	.020000	.020000	81/04/28	82/01/27
				K	1	.010000			.010000	.010000	81/07/20	81/07/20
				TOT	4	.017500	.000025	.005000	.020000	.010000	81/04/28	82/01/27
39571	DIAZINON	MUD	UG/KG	K	1	.100000			.100000	.100000	[illegible]/20	81/07/20
39600	MPARATHN	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/[illegible]/28	82/01/27
39601	MPARATHN	MUD	UG/KG	K	1	.100000			.100000	.100000	81/[illegible]/20	81/07/20
39730	2,4-D	WHL SMPL	UG/L		3	.033333	.000633	.025166	.060000	.010000	81/[illegible]/28	82/01/27
				K	1	.010000			.010000	.010000	[illegible]/22	81/10/[illegible]
				TOT	4	.027500	.000558	.023629	.060000	.010000	81/[illegible]/28	82/01/27

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BAYOU SEGNETTE NEAR BARATARIA, LA
22051 LOUISIANA JEFFERSON

TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624120-0289105

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39740	2,4,5-T	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39755	MIREX	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39758	MIREX	BOT MAT	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39760	SILVEX	WHL SMPL	UG/L		1	.010000			.010000	.010000	81/10/22	81/10/22
				K	3	.010000	.000000	.000000	.010000	.010000	81/04/28	82/01/27
				TOT	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39786	TRITHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39787	TRITHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
39790	MTRTHION	WHL SMPL	UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
39791	MTRTHION	MUD	UG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
60050	ALGAE	TOTAL	/ML		4	148700	.333E+11	182634	380000	1800.00	81/04/28	82/01/27
70300	RESIDUE	DISS-180	C MG/L		12	3108.33	1452887	1205.36	5370.00	1680.00	81/04/28	82/03/04
70301	DISS SOL	SUM	MG/L		12	3032.50	1437109	1198.79	5150.00	1540.00	81/04/28	82/03/04
70303	DISS SOL	TONS PER	ACRE-FT		12	4.22666	2.68704	1.63922	7.30000	2.28000	81/04/28	82/03/04
71846	AMMONIA	DISS-NH4	MG/L		12	.299166	.090408	.300680	.990001	.060000	81/04/28	82/03/04
71886	TOTAL P	AS PO4	MG/L		12	.625833	.138045	.371544	1.20000	.210000	81/04/28	82/03/04
71890	MERCURY	HG,DISS	UG/L		2	.950000	.045000	.212132	1.10000	.800000	81/04/28	81/07/20
				K	1	.100000			.100000	.100000	82/01/27	82/01/27
				TOT	3	.666667	.263334	.513161	1.10000	.100000	81/04/28	82/01/27
71921	MERCURY	SEDMG/KG	DRY WGT		1	.040000			.040000	.040000	81/07/20	81/07/20
81886	PERTHANE	SED DRY	WGTUG/KG	K	1	.100000			.100000	.100000	81/07/20	81/07/20
82068	POTAS 40	K-40,DIS	PC/LITER		3	22.6667	22.3341	4.72590	28.0000	19.0000	81/05/19	81/07/20
82183	2,4-DP	DICLPROP	TOT UG/L	K	4	.010000	-.776E-10	.000000	.010000	.010000	81/04/28	82/01/27
85209	ALGAL	GRO PNTL	MG/L		2	13.0000	8.00000	2.82843	15.0000	11.0000	81/04/28	81/07/20

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KENTA CANAL EAST OF CROWN POINT, LA
22051 LOUISIANA JEFFERSON

TYPA/AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624122-0289107

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	23.1500	44.8346	6.69587	33.5000	10.5000	81/04/28	82/03/04
00028	ANALYZE	AGENCY	CODE		12	80015.0-	.595E+04	.000000	80020.0	80010.0	81/04/28	82/03/04
00076	TURB	TRBIDMTR	HACH FTU		12	17.8333	271.423	16.4749	50.0000	3.00000	81/04/28	82/03/04
00080	COLOR	PT-CO	UNITS		12	78.3332	3615.15	60.1261	200.000	20.0000	81/04/28	82/03/04
00095	CNDUCTVY	AT 25C	MICROMHO		12	2517.50	5472056	2339.24	9540.00	660.000	81/04/28	82/03/04
00300	DO		MG/L		11	5.34545	4.62878	2.15146	7.70000	.800000	81/04/28	82/03/04
00310	BOD	5 DAY	MG/L		12	3.36666	5.44246	2.33291	7.70000	.000000	81/04/28	82/03/04
00340	COD	HI LEVEL	MG/L		11	94.0909	4216.09	64.9315	240.000	27.0000	81/04/28	82/03/04
				K	1	10.0000			10.0000	10.0000	81/12/17	81/12/17
				TOT	12	87.0833	4422.08	66.4987	240.000	10.0000	81/04/28	82/03/04
00400	PH		SU		12	7.00833	.477250	.690833	7.70000	5.00000	81/04/28	82/03/04
00403	LAB	PH	SU		10	7.43000	.073486	.271084	7.90000	7.00000	81/04/28	82/01/27
00410	T ALK	CACO3	MG/L		12	107.583	423.006	20.5671	135.000	77.0000	81/04/28	82/03/04
00530	RESIDUE	TOT NFLT	MG/L		12	47.9166	939.181	30.6461	121.000	19.0000	81/04/28	82/03/04
00602	DISS.	NITROGEN	MG/L N		12	3.17499	14.1057	3.75575	15.0000	1.40000	81/04/28	82/03/04
00607	ORG N	DISS-N	MG/L		12	2.29166	13.8009	3.71495	14.0000	.400000	81/04/28	82/03/04
00608	NH3+NH4-	N DISS	MG/L		12	.250000	.021891	.147956	.600000	.100000	81/04/28	82/03/04
00623	KJELDL N	DISS	MG/L		12	2.52332	13.3300	3.65103	14.0000	.520000	81/04/28	82/03/04
00631	NO2&NO3	N-DISS	MG/L		12	.674166	.446954	.668546	1.90000	.060000	81/04/28	82/03/04
00665	PHOS-TOT		MG/L P		11	.259091	.016149	.127080	.490000	.120000	81/04/28	82/03/04
00900	TOT HARD	CACO3	MG/L		12	309.166	45880.9	214.198	950.000	160.000	81/04/28	82/03/04
00902	NC HARD	CACO3	MG/L		12	202.583	46875.4	216.507	860.000	68.0000	81/04/28	82/03/04
00915	CALCIUM	CA,DISS	MG/L		12	49.7499	353.846	18.8108	100.000	32.0000	81/04/28	82/03/04
00925	MGNSIUM	MG,DISS	MG/L		12	44.9166	1699.91	41.2299	170.000	16.0000	81/04/28	82/03/04
00930	SODIUM	NA,DISS	MG/L		12	393.582	185171	430.315	1700.00	63.0000	81/04/28	82/03/04
00931	SODIUM	ADSBTION	RATIO		12	8.91666	29.6379	5.44407	24.0000	2.10000	81/04/28	82/03/04
00932	PERCENT	SODIUM	%		12	67.8333	84.8888	9.21351	78.0000	45.0000	81/04/28	82/03/04
00935	PTSSIUM	K,DISS	MG/L		12	13.3500	162.932	12.7645	52.0000	4.50000	81/04/28	82/03/04
00940	CHLORIDE	TOTAL	MG/L		12	691.582	541489	735.859	2900.00	99.0000	81/04/28	82/03/04
00945	SULFATE	SO4-TOT	MG/L		12	90.4166	11684.8	108.096	400.000	4.00000	81/04/28	82/03/04
00950	FLUORIDE	F,DISS	MG/L		12	.316666	.012424	.111465	.500000	.200000	81/04/28	82/03/04
00955	SILICA	DISOLVED	MG/L		12	4.93333	7.99876	2.82821	9.90000	1.30000	81/04/28	82/03/04
01046	IRON	FE,DISS	UG/L		2	275.000	449.937	21.2117	290.000	260.000	82/02/24	82/03/04
01056	MANGNESE	MN,DISS	UG/L		2	355.000	4049.94	63.6391	400.000	310.000	82/02/24	82/03/04
31625	FEC COLI	M-FCAGAD	/100 ML		7	4281.42	.701E+08	8376.18	23000.0	140.000	81/04/28	82/03/04
				B	4	295.000	164967	406.161	900.000	50.0000	[illegible]	82/02/24
				K	1	100.0000			100.0000	100.0000	81/11/19	81/11/19
				TOT	12	2604.16	.426E+08	6527.91	23000.0	50.0000	81/04/28	82/03/04
31673	FECSTREP	MFKFAGAR	/100ML		9	11148.3	.177E+09	13327.8	40000.0	740.000	81/04/28	82/03/04
				B	3	130267	.167E+11	129600	260000	800.000	[illegible]	[illegible]
				TOT	12	40328.3	.608E+10	78008.5	260000	740.000	81/04/28	82/03/04

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KENTA CANAL EAST OF CROWN POINT, LA
22051 LOUISIANA JEFFERSON

/TYFA AMBNT/STREAM

112WRD 811107 08090301000
0000 CLASS 00 CSN-RSP 0624122-0289107

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
70300 RESIDUE	DISS-180	C MG/L		12	1439.17	1946370	1395.12	5660.00	366.000	81/04/28	82/03/04
70301 DISS SOL	SUM	MG/L		12	1353.41	1764170	1328.22	5380.00	363.000	81/04/28	82/03/04
70303 DISS SOL	TONS PER	ACRE-FT		12	1.95750	3.60226	1.89796	7.70000	.500000	81/04/28	82/03/04
71846 AMMONIA	DISS-NH4	MG/L		12	.322500	.036220	.190316	.770001	.130000	81/04/28	82/03/04
71886 TOTAL P	AS PO4	MG/L		11	.789091	.148269	.385057	1.50000	.370000	81/04/28	82/03/04
82068 POTAS-40	K-40,DIS	PC/LITER		3	17.3666	360.924	18.9980	39.0000	3.40000	81/04/28	81/07/01

GROSS

6 TOTAL STATIONS PROCESSED

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		69	23.4275	43.5308	6.59779	36.0000	10.5000	81/04/28	82/03/04
00028	ANALYZE	AGENCY	CODE		71	80014.8	1872.46	43.2719	80020.0	80010.0	81/04/28	82/03/04
00076	TURB	TRBIDMTR	HACH FTU		71	9.84506	96.0469	9.80035	50.0000	1.00000	81/04/28	82/03/04
00080	COLOR	PT-CO	UNITS		71	55.4224	1063.40	32.6098	200.000	5.00000	81/04/28	82/03/04
00095	CNDUCTVY	AT 25C	MICROMHO		71	3186.39	4130271	2032.31	9540.00	520.000	81/04/28	82/03/04
00300	DO		MG/L		70	5.50999	11.8187	3.43783	13.1000	.000000	81/04/28	82/03/04
00310	BOD	5 DAY	MG/L		71	4.57182	6.29355	2.50869	9.60000	.000000	81/04/28	82/03/04
00339	COD MUD	DRY WGT	MG/KG		3	254000	.197E+11	140385	340000	92000.0	81/07/20	81/07/20
00340	COD	HI LEVEL	MG/L		66	123.394	6213.28	78.8243	440.000	27.0000	81/04/28	82/03/04
				K	5	10.0000	.000000	.000000	10.0000	10.0000	81/12/17	81/12/17
				TOT	71	115.408	6623.23	81.3833	440.000	10.0000	81/04/28	82/03/04
00400	PH		SU		71	7.01548	.193722	.440139	7.80000	5.00000	81/04/28	82/03/04
00403	LAB	PH	SU		59	7.29490	.064436	.253843	8.20000	6.80000	81/04/28	82/01/27
00410	T ALK	CACO3	MG/L		71	111.394	3417.91	58.4629	273.000	43.0000	81/04/28	82/03/04
00496	LOSS ON	IGNITION	MG/KG		3	245000	.705E+10	84017.7	295000	148000	81/07/20	81/07/20
00530	RESIDUE	TOT NFLT	MG/L		71	28.9577	549.670	23.4450	121.000	1.00000	81/04/28	82/03/04
00557	OIL-GRSE	MUD FRGR	MG/KG		3	.000000	.000000	.000000	.000000	.000000	81/07/20	81/07/20
00602	DISS.	NITROGEN	MG/L N		70	5.12013	39.3032	6.26923	26.0000	.710001	81/04/28	82/03/04
00607	ORG N	DISS-N	MG/L		69	3.11942	28.9361	5.37923	25.0000	.000000	81/04/28	82/03/04
00608	NH3+NH4-	N DISS	MG/L		69	1.69971	11.6090	3.40720	17.0000	.050000	81/04/28	82/03/04
				K	1	.070000			.070000	.070000	81/08/06	81/08/06
				TOT	70	1.67643	11.4787	3.38803	17.0000	.050000	81/04/28	82/03/04
00611	NH3 MUD	DRY WGT	MG/KG-N		3	273.333	8633.41	92.9161	380.000	210.000	81/07/20	81/07/20
00623	KJELDL N	DISS	MG/L		70	4.63970	40.7896	6.38668	26.0000	.520000	81/04/28	82/03/04
00626	ORGAN. N	MUD D WT	MG/KG-N		3	5466.66	9743384	3121.44	7700.00	1900.00	81/07/20	81/07/20
00630	NO2&NO3	N-TOTAL	MG/L		5	.146000	.053630	.231582	.560000	.030000	81/05/19	81/05/19
00631	NO2&NO3	N-DISS	MG/L		70	.501000	.485699	.696921	4.00000	.000000	81/04/28	82/03/04
00665	PHOS-TOT		MG/L P		70	1.26700	3.31843	1.82166	8.40000	.040000	81/04/28	82/03/04
00721	CYANIDE	SEDMG/KG	DRY WGT		3	.000000	.000000	.000000	.000000	.000000	81/07/20	81/07/20
00900	TOT HARD	CACO3	MG/L		71	375.492	31176.9	176.570	950.000	120.000	81/04/28	82/03/04
00902	NC HARD	CACO3	MG/L		70	265.357	40489.1	201.219	860.000	.000000	81/04/28	82/03/04
00915	CALCIUM	CA,DISS	MG/L		71	56.3661	284.010	16.8526	120.000	24.0000	81/04/28	82/03/04
00916	CALCIUM	CA-TOT	MG/L		1	59.0000			59.0000	59.0000	81/12/17	81/12/17
00925	MGNSIUM	MG,DISS	MG/L		71	56.8816	1438.54	37.9281	170.000	8.60000	81/04/28	82/03/04
00930	SODIUM	NA,DISS	MG/L		71	505.098	142352	377.295	1700.00	44.0000	81/04/28	82/03/04
00931	SODIUM	ADSBTION	RATIO		71	10.6127	30.0841	5.48490	24.0000	1.90000	81/04/28	82/03/04
00932	PERCENT	SODIUM	%		71	69.0280	101.901	10.0946	79.0000	44.0000	81/04/28	82/03/04
00935	PTSSIUM	K,DISS	MG/L		71	17.3493	145.014	12.0422	56.0000	4.50000	81/04/28	82/03/04
00940	CHLORIDE	TOTAL	MG/L		71	886.182	463173	680.568	2900.00	60.0000	81/04/28	82/03/04
00945	SULFATE	SO4-TOT	MG/L		71	132.952	9261.57	96.2371	400.000	4.00000	81/04/28	82/03/04
00950	FLUORIDE	F,DISS	MG/L		71	.273239	.010274	.101361	.500000	.10000[illegible]	[illegible]	82/03/04

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6 TOTAL STATIONS PROCESSED

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00955 SILICA	DISOLVED	MG/L		71	6.77605	19.2150	4.38350	19.0000	.100000	81/04/28	82/03/04
01000 ARSENIC	AS,DISS	UG/L		11	1.72727	2.01819	1.42063	4.00000	.000000	81/04/28	82/01/27
01003 ARSENIC	SEDMG/KG	DRY WGT		3	7.66667	5.33340	2.30942	9.00000	5.00000	81/07/20	81/07/20
01010 BERYLIUM	BE,DISS	UG/L		7	4.42857	27.2857	5.22357	10.0000	.000000	81/04/28	81/10/22
			K	4	7.75000	20.2500	4.50000	10.0000	1.00000	81/10/22	82/01/27
			TOT	11	5.63636	25.2546	5.02539	10.0000	.000000	81/04/28	82/01/27
01013 BERYLIUM	SEDMG/KG	DRY WGT		3	1.00000	1.00000	1.00000	2.00000	.000000	81/07/20	81/07/20
01025 CADMIUM	CD,DISS	UG/L		8	.750000	.214286	.462910	1.00000	.000000	81/04/28	82/01/27
			K	3	1.00000	.000000	.000000	1.00000	1.00000	81/04/28	82/01/27
			TOT	11	.818182	.163636	.404520	1.00000	.000000	81/04/28	82/01/27
01028 CD MUD	DRY WGT	MG/KG-CD		3	1.66667	.333337	.577353	2.00000	1.00000	81/07/20	81/07/20
01029 CHROMIUM	SEDMG/KG	DRY WGT		3	5.66667	26.3334	5.13161	10.0000	.000000	81/07/20	81/07/20
01030 CHROMIUM	CR,DISS	UG/L		10	9.00000	54.4444	7.37865	20.0000	.000000	81/04/28	82/01/27
			K	1	10.0000			10.0000	10.0000	82/01/27	82/01/27
			TOT	11	9.09091	49.0909	7.00649	20.0000	.000000	81/04/28	82/01/27
01032 CHROMIUM	HEX-VAL	UG/L		3	.000000	.000000	.000000	.000000	.000000	81/07/20	81/07/20
			K	5	1.00000	.000000	.000000	1.00000	1.00000	81/10/22	82/01/27
			TOT	8	.625000	.267857	.517549	1.00000	.000000	81/07/20	82/01/27
01040 COPPER	CU,DISS	UG/L		10	4.00000	1.77778	1.33333	7.00000	2.00000	81/04/28	82/01/27
01043 COPPER	SEDMG/KG	DRY WGT		3	23.6667	21.3341	4.61889	29.0000	21.0000	81/07/20	81/07/20
01046 IRON	FE,DISS	UG/L		22	101.954	9668.69	98.3295	340.000	10.0000	81/04/28	82/03/04
			K	1	10.0000			10.0000	10.0000	82/01/27	82/01/27
			TOT	23	97.9564	9596.84	97.9635	340.000	10.0000	81/04/28	82/03/04
01049 LEAD	PB,DISS	UG/L		11	1.36364	.454547	.674201	2.00000	.000000	81/04/28	82/01/27
01052 LEAD	SEDMG/KG	DRY WGT		3	23.3333	33.3337	5.77354	30.0000	20.0000	81/07/20	81/07/20
01053 MN MUD	DRY WGT	MG/KG-MN		3	546.666	157034	396.275	960.000	170.000	81/07/20	81/07/20
01056 MANGNESE	MN,DISS	UG/L		23	305.912	326415	571.327	2700.00	.000000	81/04/28	82/03/04
01065 NICKEL	NI,DISS	UG/L		11	2.00000	2.80000	1.67332	6.00000	.000000	81/04/28	82/01/27
01068 NICKEL	SEDMG/KG	DRY WGT		3	23.3333	33.3337	5.77354	30.0000	20.0000	81/07/20	81/07/20
01090 ZINC	ZN,DISS	UG/L		11	19.4545	63.2730	7.95444	30.0000	10.0000	81/04/28	82/01/27
01093 ZINC	SEDMG/KG	DRY WGT		3	93.6667	60.3477	7.76838	100.000	85.0000	81/07/20	81/07/20
01145 SELENIUM	SE,DISS	UG/L		6	.000000	.000000	.000000	.000000	.000000	81/04/28	81/07/20
			K	5	1.00000	.000000	.000000	1.00000	1.00000	81/10/22	82/01/27
			TOT	11	.454545	.272727	.522233	1.00000	.000000	81/04/28	82/01/27
01148 SELENIUM	SEDMG/KG	DRY WGT		3	.333333	.333333	.577350	1.00000	.000000	81/07/20	81/07/20
31625 FEC COLI	M-FCAGAD	/100 ML		25	2949.19	.504E+08	7104.47	29000.0	110.000	81/04/28	82/03/04
			B	40	2242.42	.109E+09	10444.1	65000.0	2.00000	81/04/28	82/03/04
			K	2	55.0000	4050.00	63.6396	100.0000	10.00000	81/10/22	81/11/19
			L	1	800.000			800.000	800.000	82/03/04	82/03/04
			TOT	68	2416.71	.819E+08	9050.03	65000.0	2.00000	81/04/28	82/03/04
31673 FECSTREP	MFKFAGAR	/100ML		56	4743.74	.621E+08	7884.25	40000.0	190.000	81/04/28	82/03/04

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PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
31673	FECSTREP	MFKFAGAR	/100ML	B	15	34501.3	.562E+10	75024.8	260000	10.00000	81/04/28	82/03/04
				TOT	71	11030.5	.132E+10	36390.3	260000	10.00000	81/04/28	82/03/04
39034	PERTHANE	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39250	NAPTHAL	ENES, PC	. UG/L	K	12	.100000	.108E-07	.000104	.100000	.100000	81/04/28	82/01/27
39251	PCNS	MUD	UG/KG	K	3	1.00000	.000000	.000000	1.00000	1.00000	81/07/20	81/07/20
39330	ALDRIN		TOT UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39333	ALDRIN	SEDUG/KG	DRY WGT	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39340	GAMMABHC	LINDANE	TOT.UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39343	GBHC-MUD	LINDANE	DRYUG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39350	CHLRDANE	TECH&MET	TOT UG/L	K	12	.100000	.108E-07	.000104	.100000	.100000	81/04/28	82/01/27
39351	CDANEDRY	TECH&MET	MUDUG/KG		3	9.66667	8.33350	2.88678	13.0000	8.00000	81/07/20	81/07/20
39360	DDD	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39363	DDD	MUD	UG/KG		2	2.10000	.720001	.848529	2.70000	1.50000	81/07/20	81/07/20
				K	1	.100000			.100000	.100000	81/07/20	81/07/20
				TOT	3	1.43333	1.69333	1.30128	2.70000	.100000	81/07/20	81/07/20
39365	DDE	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39368	DDE	MUD	UG/KG		1	.200000			.200000	.200000	81/07/20	81/07/20
				K	2	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
				TOT	3	.133333	.003333	.057735	.200000	.100000	81/07/20	81/07/20
39370	DDT	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39373	DDT	MUD	UG/KG		1	1.20000			1.20000	1.20000	81/07/20	81/07/20
				K	2	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
				TOT	3	.466666	.403333	.635085	1.20000	.100000	81/07/20	81/07/20
39380	DIELDRIN		TOTUG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39383	DIELDRIN	SEDUG/KG	DRY WGT	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39388	ENDOSULN	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39389	ENDOSULN	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39390	ENDRIN		TOT UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39393	ENDRIN	SEDUG/KG	DRY WGT	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39398	ETHION	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39399	ETHION	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39400	TOXAPHEN		TOTUG/L	K	12	.100000	.108E-07	.000104	.100000	.100000	81/04/28	82/01/27
39403	TOXAPHEN	SEDUG/KG	DRY WGT	K	3	1.00000	.000000	.000000	1.00000	1.00000	[illegible]	81/07/20
39410	HEPTCHLR		TOTUG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39413	HEPTCHLR	SEDUG/KG	DRY WGT	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39420	HPCHLREP		TOTUG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39423	HPCHLREP	SEDUG/KG	DRY WGT	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39480	MTHXYCLR	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39481	MTHXYCLR	MUD DRY	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39516	PCBS	WHL SMPL	UG/L	K	12	.100000	.108E-07	.000104	.100000	.100000	[illegible]	82/01/27
39519	PCBS	MUD	UG/KG		1	14.0000			14.0000	14.0000	[illegible]	81/07/20

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PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39519	PCBS	MUD	UG/KG	K	2	1.00000	.000000	.000000	1.00000	1.00000	81/07/20	81/07/20
				TOT	3	5.33333	56.3333	7.50555	14.0000	1.00000	81/07/20	81/07/20
39530	MALATHN	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39531	MALATHN	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39540	PARATHN	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39541	PARATHN	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39570	DIAZINON	WHL SMPL	UG/L		9	.025556	.000403	.020069	.060000	.010000	81/04/28	82/01/27
				K	3	.010000	.000000	.000000	.010000	.010000	81/07/20	82/01/27
				TOT	12	.021667	.000342	.018505	.060000	.010000	81/04/28	82/01/27
39571	DIAZINON	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39600	MPARATHN	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39601	MPARATHN	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39730	2,4-D	WHL SMPL	UG/L		10	.045000	.000650	.025495	.080000	.010000	81/04/28	82/01/27
				K	2	.010000	.000000	.000000	.010000	.010000	81/10/22	82/01/27
				TOT	12	.039167	.000717	.026785	.080000	.010000	81/04/28	82/01/27
39740	2,4,5-T	WHL SMPL	UG/L		1	.010000			.010000	.010000	81/10/22	81/10/22
				K	11	.010000	.698E-10	.000008	.010000	.010000	81/04/28	82/01/27
				TOT	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39755	MIREX	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39758	MIREX	BOT MAT	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39760	SILVEX	WHL SMPL	UG/L		1	.010000			.010000	.010000	81/10/22	81/10/22
				K	11	.010000	.209E-09	.000014	.010000	.010000	81/04/28	82/01/27
				TOT	12	.010000	.211E-09	.000015	.010000	.010000	81/04/28	82/01/27
39786	TRITHION	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39787	TRITHION	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
39790	MTRTHION	WHL SMPL	UG/L	K	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
39791	MTRTHION	MUD	UG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
60050	ALGAE	TOTAL	/ML		12	261183	.229E+12	478584	1700000	1800.00	81/04/28	82/01/27
70300	RESIDUE	DISS-180	C MG/L		71	1801.17	1415599	1189.79	5660.00	265.000	81/04/28	82/03/04
70301	DISS SOL	SUM	MG/L		71	1728.94	1352910	1163.15	5380.00	260.000	81/04/28	82/03/04
70303	DISS SOL	TONS PER	ACRE-FT		71	2.44915	2.61893	1.61831	7.70000	.360000	81/04/28	82/03/04
71346	AMMONIA	DISS-NH4	MG/L		70	2.15443	18.9580	4.35408	22.0000	.060000	81/04/28	82/03/04
71886	TOTAL P	AS PO4	MG/L		70	3.87485	31.0128	5.56892	26.0000	.120000	81/04/28	82/03/04
71890	MERCURY	HG,DISS	UG/L		7	.628571	.365715	.604743	1.70000	.100000	81/04/28	81/10/22
				K	4	.100000	-.372E-08	.000000	.100000	.100000	81/10/22	82/01/27
				TOT	11	.436364	.290546	.539023	1.70000	.100000	81/04/28	82/01/27
71921	MERCURY	SEDMG/KG	DRY UGT		3	.043333	.000033	.005774	.050000	.040000	81/07/20	81/07/20
81886	PERTHANE	SED DRY	WGTUG/KG	K	3	.100000	-.372E-08	.000000	.100000	.100000	81/07/20	81/07/20
82068	POTAS-40	K-40,DIS	PC/LITER		21	12.9333	87.7966	9.36998	39.0000	3.40000	81/04/28	81/07/20
82183	2,4-DP	DICLPROP	TOT UG/L		1	.010000			.010000	.010000	81/07/20	81/07/20
				K	11	.010000	.698E-10	.000008	.010000	.010000	81/04/28	82/01/27

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PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
82183	2,4-DP	DICLPROP	TOT UG/L	TOT	12	.010000	.211E-10	.000005	.010000	.010000	81/04/28	82/01/27
85209	ALGAL	GRO PNTL	MG/L		7	8.24286	24.3395	4.93351	15.0000	1.00000	81/04/28	81/10/22

9.3 CHECKLIST OF PREDOMINANT PLANT SPECIES

COMMON NAME	SCIENTIFIC NAME	FRESH MARSH	SWAMP FOREST	BOTTOMLAND HARDWOODS	OPEN WATER
Alligatorweed	Alternanthera philoxeroides	X	X		X
American threesquare	Scirpus americanus		X	X	
Ash, green	Fraxinus pennsylvanica		X	X	
Ash, pumpkin	Fraxinus tomentosa			X	
Ash, water	Fraxinus caroliniana			X	
Bald cypress	Taxodium distichum		X	X	
Black willow	Salix nigra		X	X	
Blackberry/Dewberry	Rubus spp.		X	X	
Blue flag iris	Iris versivolor		X	X	
Bulltongue	Sagittaria falcata	X	X		
Bushy Beardgrass	Andropogon glomeratus	X	X		
Buttonbush	Cephalanthus occidentalis		X		
Camphorweed	Pluchea camphorata	X	X	X	
Carolina waterhysop	Bacopa caroliniana	X			X
Cattail	Typha spp.	X			
Coffeweed	Sesbani exaltata				

Plants (continued)

COMMON NAME	SCIENTIFIC NAME	FRESH MARSH	SWAMP FOREST	BOTTOMLAND HARDWOODS	OPEN WATER
Coontail	Ceratophyllum demersum				X
Cutgrass	Zinzaniopsis milliaceae	X	X		
Deciduous Holly	Ilex decidua			X	
Dogwood, roughleaf	Cornus drummondii			X	
Drummond red maple	Acer rubrum drummondii		X	X	
Duckweed, common	Lemna minor	X			X
Duckweed, large	Spirodela polyrhiza	X			X
Elephants ear	Colocasia antiquorum	X	X		X
Elderberry	Sambucus canadensis			X	
Elm, American	Ulmus americana			X	
Elm, winged	Ulmus alata			X	
Fall panicum	Panicum dichotomiflorium	X	X	X	
Fanwort	Cabomba caroliniana				X
Foxtail, giant	Setaria magna	X			
Foxtail, yellow	Setaria glauca	X			
Frogbit, common	Limnobium spongia	X			X

Plants (continued)

COMMON NAME	SCIENTIFIC NAME	FRESH MARSH	SWAMP FOREST	BOTTOMLAND HARDWOODS	OPEN WATER
Goldenrod	Solidago sp.		X	X	
Great bulrush	Scirpus validus	X	X	X	
Greenbrier	Smilax spp.		X	X	
Hackberry	Celtis laevigata			X	
Hickory, Butternut	Carya cordiformis			X	
Hickory, Shagbark	Carya ovata			X	
Honey locust	Gleditsia triacanthos			X	
Joint grass	Paspalum vaginatum	X	X		
Maidencane	Panicum hemitomon	X	X		
Marsh elder	Iva frutescens		X		
Oak, live	Quercus virginiana			X	
Oak, overcup	Quercus lyrata		X	X	
Oak, water	Quercus nigra		X	X	
Palmetto	Sabal minor	X	X	X	
Pecan	Carya illinoensis			X	
Pennywort, floating	Hydrocotyle ranunculoides	X			X

Plants (continued)

COMMON NAME	SCIENTIFIC NAME	FRESH MARSH	SWAMP FOREST	BOTTOMLAND HARDWOODS	OPEN WATER
Pennywort, round	*Hydrocotyle umbellata*	X			X
Pennywort, whorled	*Hydrocotyle verticillata*	X			X
Peppervines	*Ameplopsis* spp.			X	
Pickerelweed	*Pontederia cordata*	X			
Pink hybiscus	*Kosteletzkya virginica*	X	X		
Poison ivy	*Rhus radicans*		X	X	
Pondweed	*Potamogeton pusillus*				X
Rattlebox	*Daubentonia texana*		X		
Red Maple	*Acer rubrum*			X	
Roseau	*Phragmites communis*	X	X		
Royal fern	*Osmunda regalis*		X	X	
Rush, soft	*Juncus effusus*	X			
Sawgrass	*Cladium jamaicense*	X			
Sedges	*Carex spp.*	X			
Shield fern	*Thelypteris normalis*		X	X	
Smartweeds	*Polygonum* spp.	X	X	X	

Plants (continued)

COMMON NAME	SCIENTIFIC NAME	FRESH MARSH	SWAMP FOREST	BOTTOMLAND HARDWOODS	OPEN WATER
Southern magnolia	*Magnolia grandiflora*			X	
Southern sweetbay	*Magnolia virginiana*			X	
Spanish naiad	*Najas quadalupensis*				X
Spider lily	*Hymenocallis occidentalis*	X			
Spike rush	*Eleocharis* sp.	X			
Swamp blackgum	*Nyssa sylvatica*		X	X	
Sweetgum	*Liguidambar styraciflua*			X	
Tallowtree	*Sapium sebiferum*		X	X	
Turmpet creeper	*Campsis radicans*			X	
Tupelogum	*Nyssa aquatica*		X	X	
Violet	*Viola* spp.		X	X	
Virginia creeper	*Parthenocissus quinquefolia*			X	
Walter's millet	*Echinochloa walteri*	X		X	
Water hyacinth	*Eichornia crassipes*	X	X		X
Waterlocust	*Glenditsia aquatica*		X		
Waterprimrose	*Ludwigia peploides*	X			X

Plants (continued)

COMMON NAME	SCIENTIFIC NAME	FRESH MARSH	SWAMP FOREST	BOTTOMLAND HARDWOODS	OPEN WATER
Watershield	*Brasenia schreberi*				X
Watermilfoil	*Myriophyllum spicatum*				X
Wax myrtle	*Myrica cerifera*		X	X	
Widgeongrass	*Ruppia maritima*	X			X

Source: C-K Associates, Inc., 1982; USCE, 1975; USCE, 1982.

9.4 CHECKLIST OF PREDOMINANT MAMMALS

COMMNON NAME	SCIENTIFIC NAME
Bobcat	*Lynx rufus*
Brazillian free-tailed bat	*Tadarida brasiliensis*
Common muskrat	*Ondatra zibethicus*
Cotton mouse	*Peromyscus gossypinus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern pipistrelle	*Pipistrellus subflavus*
Eastern wood rat	*Neotoma floridana*
Fox squirrel	*Sciurus niger*
Fulvous harvest mouse	*Reithrodontomys fulvescens*
Gray squirrel	*Sciurus carolinensis*
Hispid cotton rat	*Sigmodon hispidus*
House mouse	*Mus musculus*
Marsh rice rat	*Oryzomys palustris*
Nearctic river otter	*Lutra canadensis*
Nine-banded armadillo	*Dasypus novemcinctus*
North American mink	*Mustela vison*
Northern raccoon	*Procyon lotor*
Northern yellow bat	*Lasiurus intermedius*
Norway rat	*Rattus norvegicus*
Nutria	*Myocastor coypus*

Mammals (continued)

COMMNON NAME	SCIENTIFIC NAME
Rafinesque's big-eared bat	Plecotus rafinesquii
Red bat	Lasiurus borealis
Roof rat	Rattus rattus
Seminole bat	Lasiurus seminolus
Southeastern myotis	Myotis austroriparius
Southern flying squirrel	Glaucomys volans
Swamp rabbit	Sylvilagus aquaticus
Virginia opossum	Didelphis virginiana
White-footed mouse	Peromyscus leucopus
White-tailed deer	Odocoileus virginianus

Source: C-K Associates, 1982; Lowery, 1974; and USCE, 1975.

9.5 CHECKLIST OF PREDOMINANT BIRDS

COMMON NAME	SCIENTIFIC NAME
Anhinga	Anhinga anhinga
American bittern	Botaurus lentiginosus
American coot	Fulica americana
American kestrel	Falco sparverius
American robin	Turdus migratorius
American wigeon	Anas americana
American woodcock	Philohela minor
Acadian flycatcher	Empidonax virescens
Bald eagle	Haliaeetus leucocephalus
Bank swallow	Riparia viparia
Barn owl	Tyto alba
Barn swallow	Hirundo rustica
Barred owl	Strix varia
Belted kingfisher	Megaceryle alcyon
Black crowned night heron	Nycticorax nycticorax
Black duck	Anas rubripes
Black vulture	Coragyps atratus
Blackspoll warbler	Dendroica striata

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Blue-gray gnatcatcher	*Polioptila caerulea*
Blue jay	*Cyanocitta cristata*
Blue-winged teal	*Anas discors*
Boat-tailed grackle	*Cassidix mexicanus*
Bobolink	*Dolichonyx oryzivorus*
Broad-winged hawk	*Buteo platypterus*
Brown creeper	*Certhia familiaris*
Brown thrasher	*Torostoma rufum*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Carolina chickadee	*Parus carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Cattle egret	*Bubulcus ibis*
Cedar waxwing	*Bonbycilla cedrorum*
Cerulean warbler	*Dendroica cerulea*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerina*
Common crow	*Corvus brachyrhnchos*
Common flicker	*Colaptes auratus*

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Common gallinule	Gallinula chloropus
Common grackle	Quiscalus quiscala
Common nighthawk	Chordeliles minor
Common snipe	Capella gallinago
Cooper's hawk	Accipiter cooperi
Chuck-Willis widow	Caprimulgus carolinensis
Dark-eyed junco	Junco hyemalis
Downy woodpecker	Dendrocopos pubescens
Eastern meadowlark	Sturnella magna
Eastern phoebe	Sayornis phoebe
Eastern wood pewee	Contopus virens
European starling	Sturnus vulgaris
Fish crow	Corvus ossifragus
Forsters tern	Sterna forsteri
Gadwall	Anas strepera
Great blue heron	Ardea herodias
Great crested flycatcher	Myiarchus crinitus
Great egret	Casmerodius albus

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Great horned owl	Bubo virginianus
Greater scaup	Aythya marila
Greater yellowlegs	Totanus melanoleucus
Green heron	Bulorides virescens
Green winged teal	Anas crecca
Hairy woodpecker	Dendrocopos villosus
Hermit thrush	Catharus guttatus
Herring gull	Larus argentatus
Hooded merganser	Lophodytes cucullatus
Hooded warbler	Wilsonia citrina
House sparrow	Passer demesticus
House wren	Troglodytes aedon
Indigo bunting	Passerina cyanea
Killdeer	Charadrius vociferus
King rail	Rallus elegans
Laughing gull	Larus atricilla
Least bittern	Ixobrychus exillis
Lesser scaup	Aythya affinis

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Lesser yellowlegs	Totanus flavipes
Little blue heron	Florida caerulea
Loggerhead shrike	Lanius ludovicianus
Long-billed marsh wren	Telmatodytes palustria
Louisiana heron	Hydranassa tricolor
Mallard	Anas platyrhynchos
Marsh hawk	Circus cyaneus
Mississippi kite	Ictinia misisippiensis
Morning dove	Zenaida macroura
Mottled duck	Anas Fulvigula
Northern cardinal	Cardinalis cardinalis
Northern house wren	Troglodytes aedon
Northern mockingbird	Mimus polyglottos
Northern parula	Parula americana
Northern shoveler	Spatula coypeata
Orange-crowned warbler	Vermivora celata
Orchard oriole	Icterus spurius
Osprey	Pandion haliaetus

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Ovenbird	Seiurus aurocapillus
Palm warbler	Dendroica palmarum
Pintail	Anas acuta
Pied-billed grebe	Podilymbus podiceps
Pileated woodpecker	Dryocopus pileatus
Pine warbler	Dendrocia pinus
Prothonotary warbler	Protonataria citrea
Purple galinule	Porphyrula martinica
Purple martin	Progene subis
Red-bellied woodpecker	Centurus carilinus
Red-brested merganser	Mergus serrator
Red-eyed vireo	Vireo olivaceus
Red head	Aythya americana
Red-headed woodpecker	Melanerpes erythrocephalus
Red shouldered hawk	Buteo lineaus
Red-tailed hawk	Buteo jamaicensis
Red-winged blackbird	Agelaius phoeniceus
Ring-necked duck	Aythya collaris
Ruby-crowned kinglet	Regulus calendula

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Rusty black bird	*Euphagus carolinus*
Scarlet tanager	*Piranga olivacea*
Screech owl	*Otus asio*
Sharp-skinned hawk	*Accipiter striatus*
Short-billed marsh wren	*Cistothorus platensis*
Snowgoose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Song sparrow	*Melospiza melodia*
Sora	*Porzana carolina*
Starling	*Sturnus vulgaris*
Summer tanager	*Piranga rubra*
Swainson's thrush	*Catharus ustulatus*
Swainson's warbler	*Limnothlypis swainsonii*
Swallow-tailed kite	*Elanoides forficatus*
Swamp sparrow	*Melospinza georgiana*
Tennessee warbler	*Vermivora peregrina*
Tree swallow	*Iridoprocne bicolor*
Towhee (rufous-sided)	*Pipilo erythrophthalmus*

Birds (continued)

COMMON NAME	SCIENTIFIC NAME
Tufted titmouse	Parus bicolor
Turkey vulture	Cathartes aura
Virginia rail	Rallus limicola
White-crowned sparrow	Zonotrichia leuophrys
White-eyed vireo	Vireo griseus
White fronted goose	Anser albifrons
White ibis	Eudocimus albus
White-faced ibis	Plegadis chihi
White-throated sparrow	Zonotrichia albicollis
White breasted nuthatch	Sitta carolinensis
Winter wren	Troglodytes troglodytes
Wood duck	Aix sponsa
Wood thrush	Hylocichla mustelina
Yellow-bellied sapsucker	Sphyrapicus varius
Yellow-billed cockoo	Coccyzus americanus
Yellow-crowned night heron	Nyctanassa violacea
Yellow-rumped vireo	Vireo flavifrons
Yellow-throated warbler	Dendroica dominica
Yellow warbler	Dendroica setechia

Source: C-K Associates, Inc., 1982; Lowery, 1974; USCE, 1975

9.6 CHECKLIST OF PREDOMINANT REPTILES AND AMPHIBIANS

COMMON NAME	SCIENTIFIC NAME
American alligator	Alligator mississippiensis
Alligator snapping turtle	Macroclemys temmincki
Banded water snake	Natrix sipedon faciata
Bird-voiced tree frog	Hyla avivoca
Broad-banded water snake	Natrix sipedon confluens
Broad-headed skink	Eumeces laticeps
Bronze frog	Rana clamitans
Bullfrog	Rana catesbeiana
Canebrake rattlesnake	Crotalus horridus
Common snapping turtle	Chelydra serpentina
Diamond-back water snake	Natrix rhombifera
Dwarf salamander	Manculus quadridigitatus
Eastern grey treefrog	Hyla versicolor
Eastern hognose snake	Heterondon platyrhinos
Eastern narrow-mouth toad	Gastrophyrne carolinensis
Eastern yellow-bellied racer	Coluber constrictor flaviventris
Five-lined skink	Eumeces fasciatus
Fowlers toad	Bufo woodhousei fowleri
Glossy water snake	Natrix rigida

Reptiles (continued)

COMMON NAME	SCIENTIFIC NAME
Graham's water snake	Natrix grahami
Green anole	Anolis carolinensis
Green tree frog	Hyla cinerea
Green water snake	Natrix cyclopion
Ground skink	Lygosoma laterale
Gulf coast smooth softshell	Trionyx muticus calvatus
Gulf coast toad	Bufo valliceps
Marbled salamander	Ambystoma opacum
Midland brown snake	Storeria dekayi wrightorum
Mississippi Diamondback terrapin	Malaclemys terrapin pileata
Mississippi mud turtle	Graptemys kohni
Mississippi ring-neck snake	Diadophis punctatus strictogenys
Northern cricket frog	Acris crepitans
Northern spring peeper	Hyla crucifer
Pig frog	Rana grylio
Razor-backed musk turtle	Sternothaerus carinatus
Red-eared turtle	Chrysemys scripta
Rough green snake	Opheodrys aestivus

Reptiles (continued)

COMMON NAME	SCIENTIFIC NAME
Small-mouthed salamander	Ambystoma texanum
Southern copperhead	Agkistrodon contortrix
Southern dusky salamander	Desmognathus fuscus
Southern leopard frog	Rana pipiens
Southern painted turtle	Chrysemys picta
Speckled king snake	Lampropeltis getulus holbrooki
Squirrel tree frog	Hyla squirrella
Stinkpot	Sternothaerus adoratus
Three-toed amphiuma	Amphiuma means tridactylum
Western chicken turtle	Deirochelys reticularia
Western cottonmouth	Agkistrodon piscivorus
Western lesser siren	Siren intermedia
Western mud snake	Farancia abacura
Western pigmy rattlesnake	Sistrurus miliarius
Western ribbon snake	Thamnophis proximus

Source: USCE, 1975; C-K Associates, 1982.

9.7 CHECKLIST OF PREDOMINENT FISHES

COMMON NAME	SCIENTIFIC NAME
Alligator gar	*Lepisosteus spatula*
Banded pigmy sunfish	*Elassoma zonatum*
Bantam sunfish	*Lepomis symmetricus*
Bay anchovy	*Anchea mitchilli*
Bigmouth buffalo	*Ictiobus cyrinellus*
Black buffalo	*Ictiobus nigra*
Black bullhead	*Ictalurus melas*
Black crappie	*Pomoxis nigromaculatus*
Blackspotted topminnow	*Fundulus olivaceus*
Blackstripe topminnow	*Fundulus notatus*
Blue catfish	*Ictalurus furcatus*
Bluegill sunfish	*Lepomis macrochirus*
Bowfin	*Amia calva*
Brook silverside	*Labidesthes sicculus*
Channel catfish	*Ictalurus punctatus*
Chain pickerel	*Esox niger*
Creek chubsucker	*Erimyzon oblongus*
Dollar sunfish	*Lepomis marginatus*

Fishes (continued)

COMMON NAME	SCIENTIFIC NAME
Flier	*Centrarchus macropterus*
Freshwater drum	*Aplodinotus grunniens*
Gizzard shad	*Dorosoma cepedianum*
Golden topminnow	*Fundulus chrysotus*
Green sunfish	*Lepomis cyanellus*
Gulf killifish	*Fundulus grandis*
Gulf menhaden	*Brevoortia patronus*
Hog choker	*Trinectes maculatus*
Lake chubsucker	*Erimyzon sucetta*
Largemouth bass	*Micropterus salmoides*
Least killifish	*Heterandria formosa*
Longear sunfish	*Lepomis megalotis*
Longnose gar	*Lepisosteus osseus*
Mosquito fish	*Gambusia affinis*
Orangespotted sunfish	*Lepomis humilis*
Pirate perch	*Aphredoderus sayanus*
Redear sunfish	*Lepomis microlophus*
Redfin pickerel	*Esox americanus*

Fishes (continued)

COMMON NAME	SCIENTIFIC NAME
Sailfin molly	*Millienisia latipinna*
Sheepshead minnow	*Cyprinodon variegatus*
Shortnose gar	*Lepisoteus platostomus*
Smallmouth buffalo	*Ictiobus bubalus*
Spotted gar	*Lepisosteus oculatus*
Spotted sucker	*Minytrema melanops*
Spotted sunfish	*Lepomis punctatus*
Starhead topminnow	*Fundulus notti*
Striped mullet	*Mugil cephalus*
Threadfin shad	*Dorosoma petenense*
Warmouth sunfish	*Lepomis gulosuc*
White crappie	*Pomoxis annularis*
Yellow bullhead	*Ictalurus natalis*

Source: C-K Associates, Inc., 1982; Douglas, 1974; USCE, 1975.

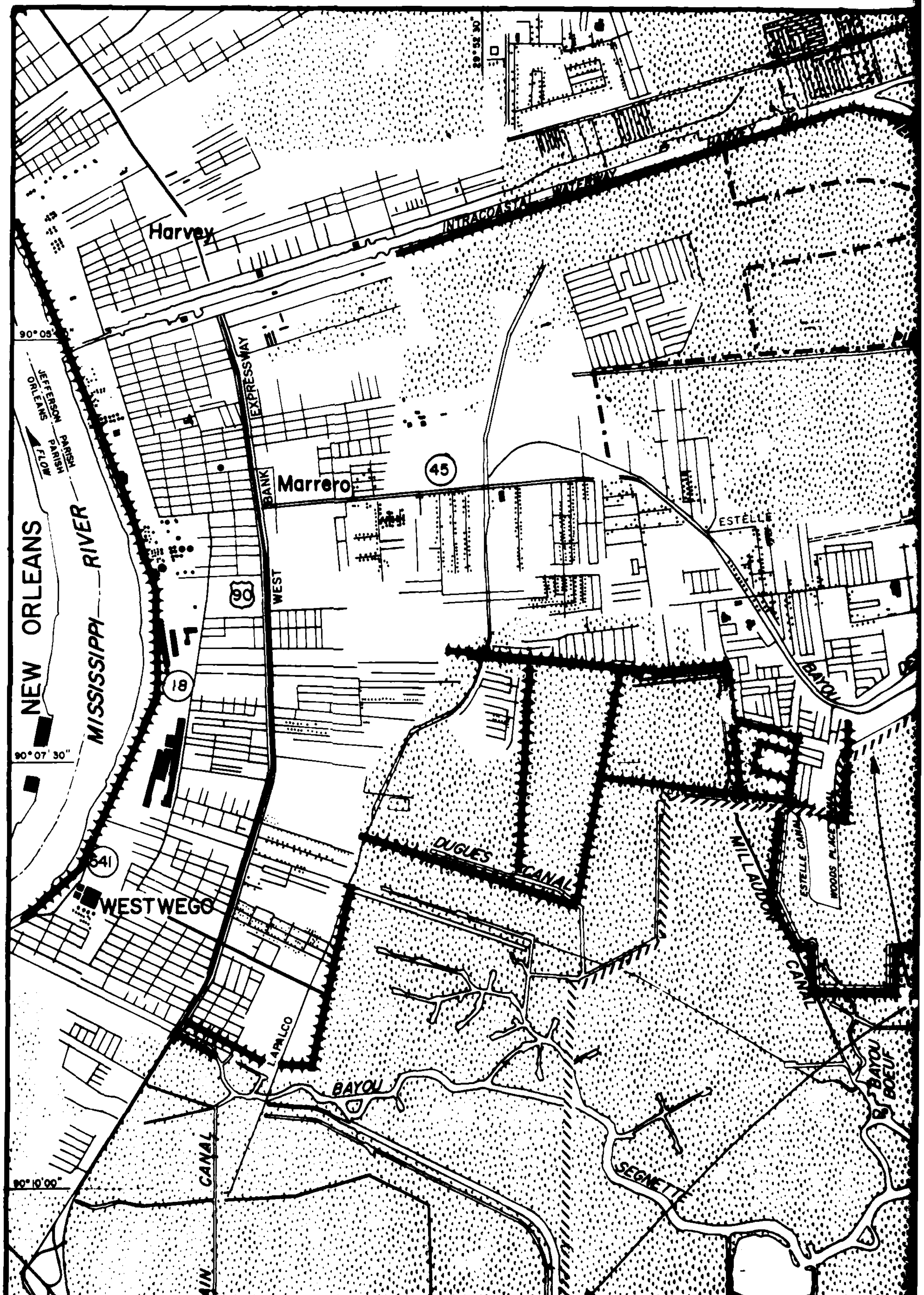
9.8 CHECKLIST OF PREDOMINANT AQUATIC INVERTEBRATES

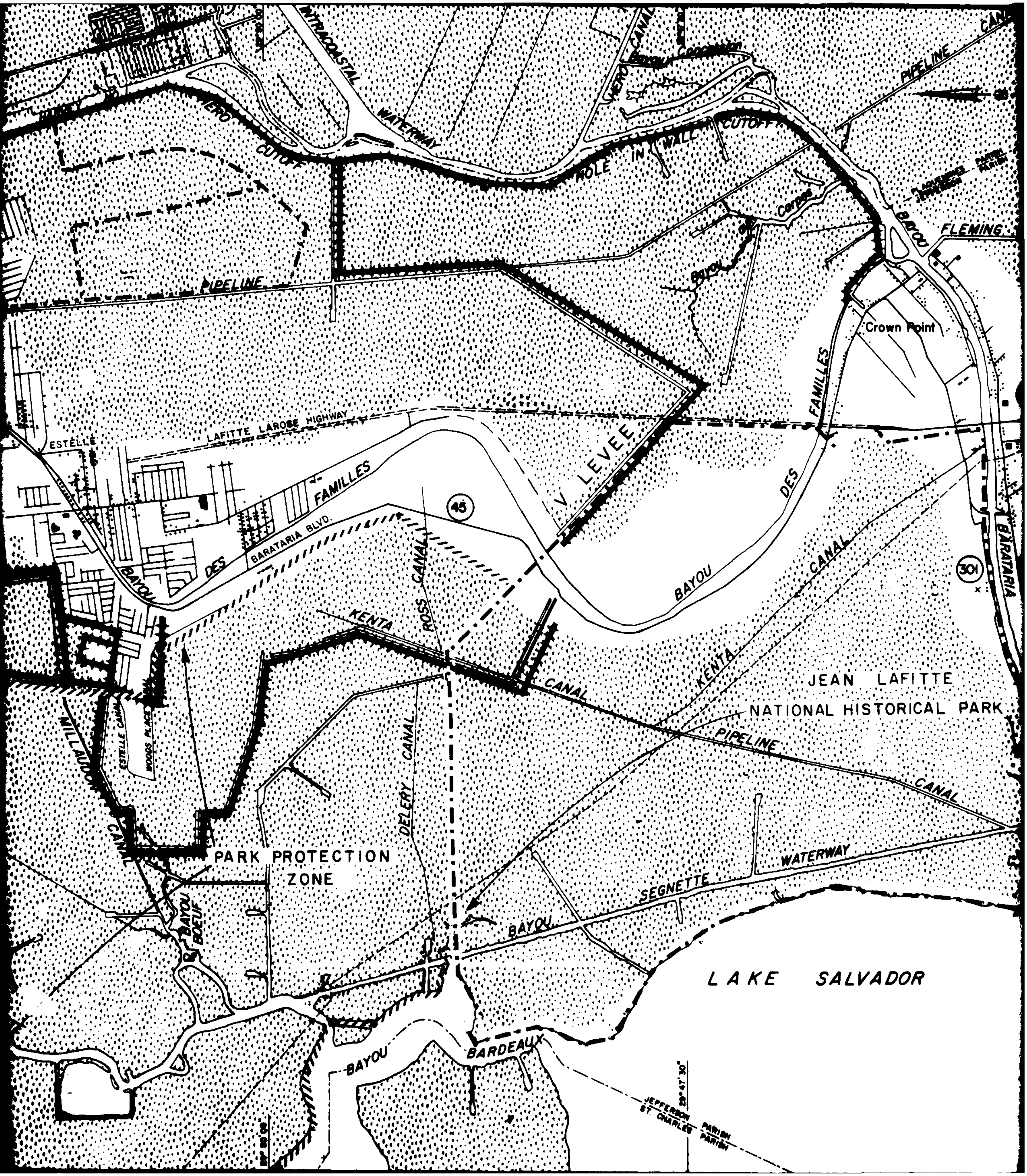
COMMON NAME	SCIENTIFIC NAME
Amphipods	Corophium spp.
Amphipods	Gammarus spp.
Bluecrab	Callinectes sapidus
Clams	Rangia cuneata
Crawfish	Faxonella clypeatus
Crawfish	Procambarus clarki
Crawfish	Procambarus vioscai
Crawfish	Procambarus acutus acutus
Crawfish	Cambarus diogenes ludovicianus
Crawfish	Fallicambarus hedgpethi
Grass shrimp	Palaemonetes spp.
Gastropod	Amnicola sp.
Midge larvae	Bezzia sp.
Midge larvae	Probezzia sp.
Midge larvae	Chironomus sp.
Midge larvae	Endochironomus sp.
Midge larvae	Clinotanypus sp.
Tubificid worms	Tubificidae

Source: USGS, 1981

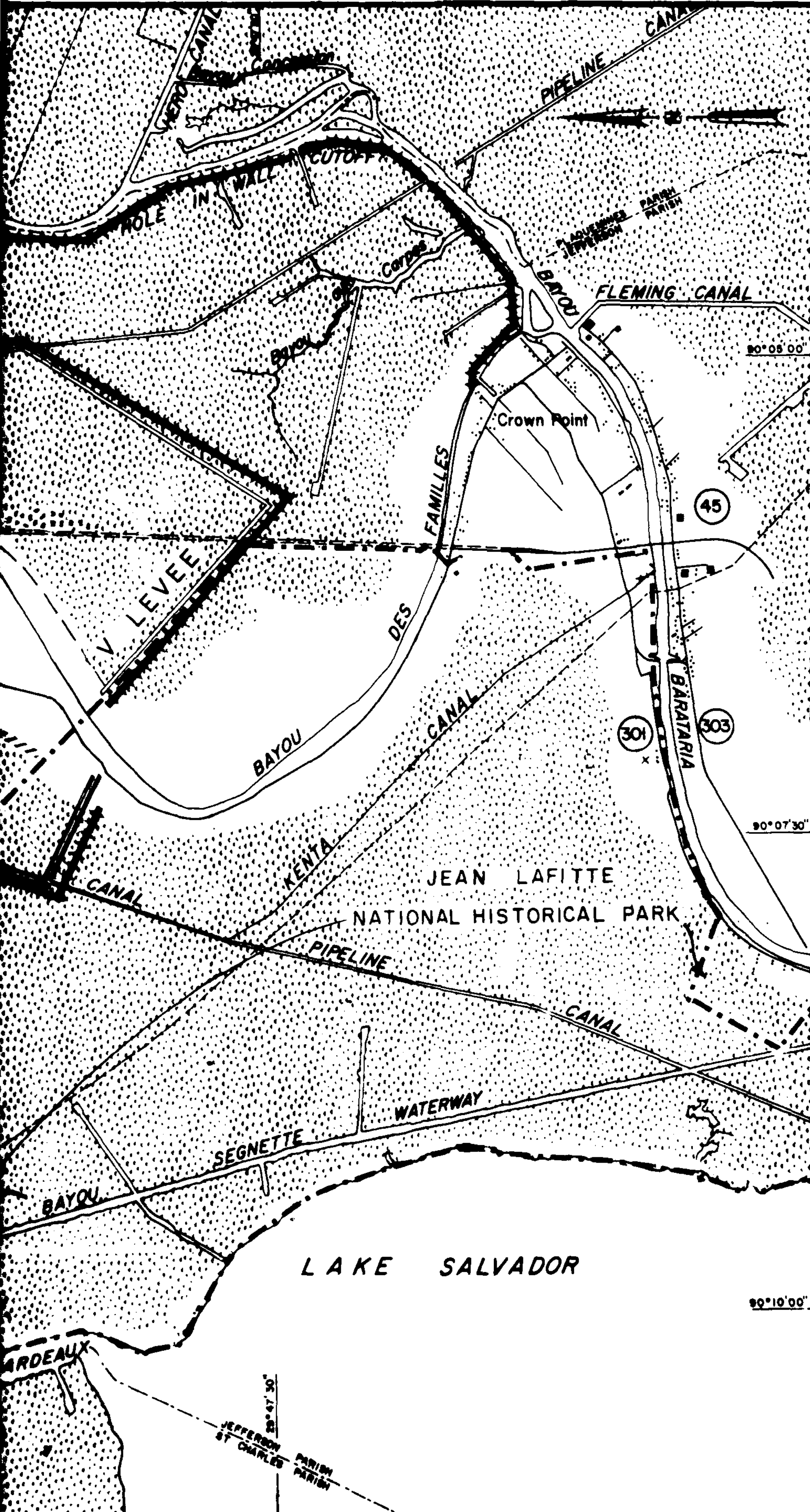
10. PLATES

LIST OF PLATES


Harvey
INTRACOASTAL WATERWAY
90°05'
JEFFERSON PARISH
ORLEANS PARISH
FLOW
NEW ORLEANS
MISSISSIPPI RIVER
WEST BANK EXPRESSWAY
Marrero
45
90
18
ESTELLE
BAYOU
90°07'30"
641
WESTWEGO
DUGUES CANAL
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE
LAPALCO
BAYOU
MAIN CANAL
SEGNETTE
BAYOU BOEUF
90°10'00"



INTRACOASTAL WATERWAY
HERO CUTOFF
HERO CANAL
HOLE IN WALL CUTOFF
PIPELINE CANAL
BAYOU FLEMING
Crown Point
PIPELINE
LAFITTE LAROSE HIGHWAY
ESTELLE
V LEVEE
BAYOU DES FAMILLES
BARATARIA BLVD.
45
301
BARATARIA
KENTA CANAL
ROSS CANAL
JEAN LAFITTE
NATIONAL HISTORICAL PARK
PIPELINE CANAL
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE
DELERY CANAL
PARK PROTECTION
ZONE
BAYOU SEGNETTE WATERWAY
BAYOU BOEUF
LAKE SALVADOR
BAYOU BARDEAUX
JEFFERSON PARISH
ST CHARLES PARISH



LEGEND

EXISTING LEVEE

LOW LEVEE

SCALE IN FEET

2000 0 2000 4000 6000

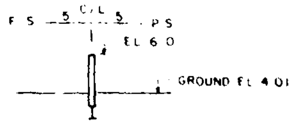
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

WEST BANK HURRICANE PROTECTION LEVEE PROJECT AREA

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

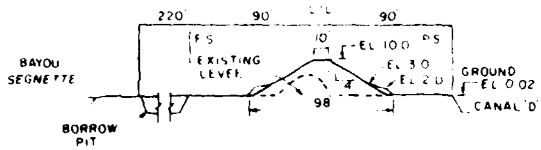
FEB 84 H-2-29663

PLATE 1



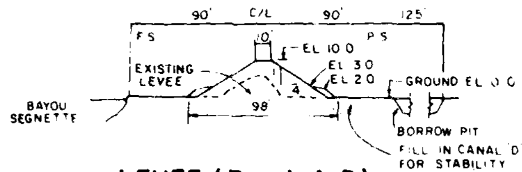
FLOODWALL (Reach A-B)

LEVEE (Reach A-B)

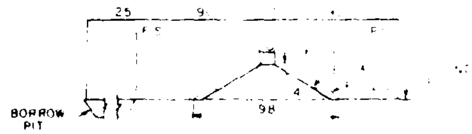


LEVEE (Reach A-B)

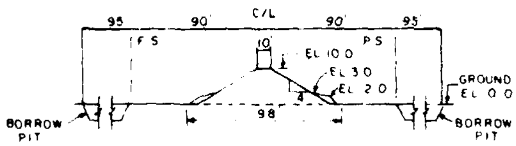
LEVEE (Reach A-B,B-C,F-G & 1-3)



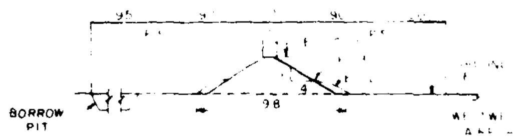
LEVEE (Reach A-B)



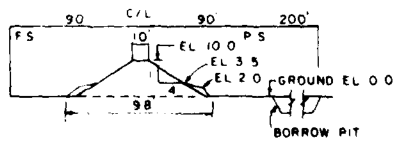
LEVEE (Reach B-C, C-D, D-E, E-F,
B-1, 1-2, 1-3, 3-E)



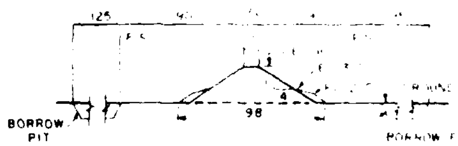
LEVEE (Reach B-C, B-1, 1-2 & 1-3)



LEVEE (Reach B-C & B-1)



LEVEE (Reach B-C & F-G)



LEVEE (Reach C-D, 1-2 & 1-3)

NOTES:

1. ALL ELEVATIONS REFER TO NATIONAL GEODETIC VERTICAL DATUM (NGVD = 0 00 MSL)
2. ALL BORROW PIT SIDE SLOPES IV 3 H

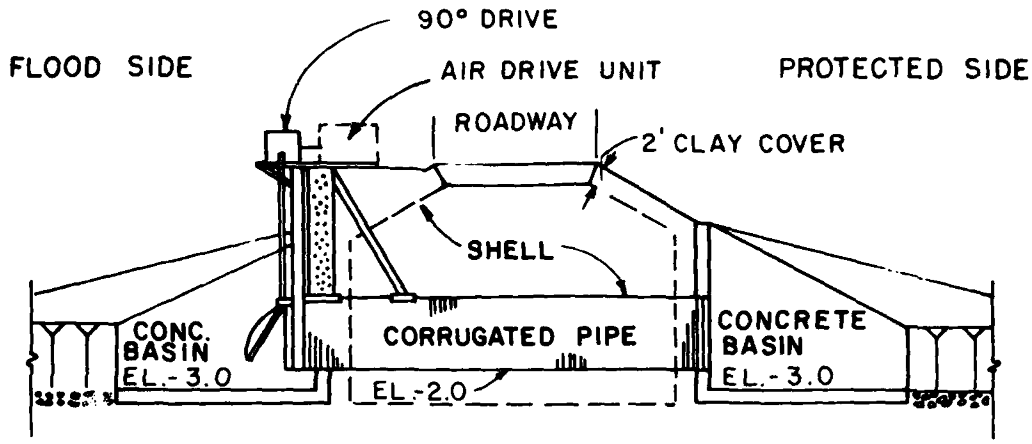
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

TYPICAL LEVEE CROSS SECTIONS FOR INITIAL CONSTRUCTION

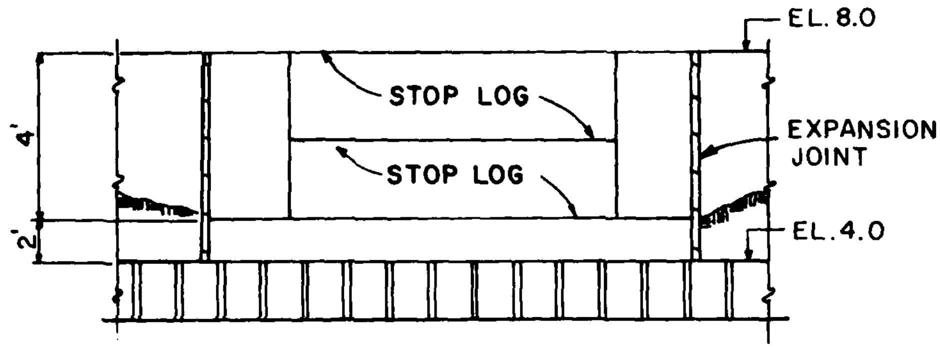
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB 1984 FILE NO. H-2-29663

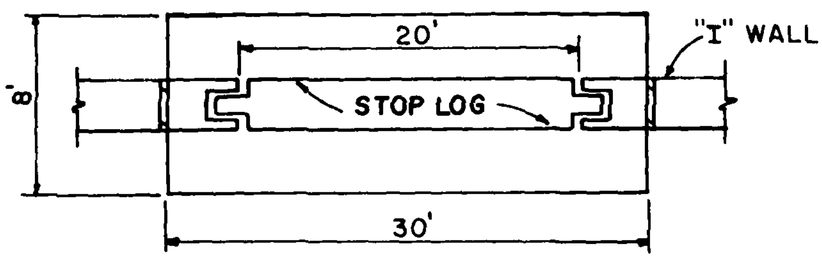
PLATE 2



SLIDE-FLAP GATE



PROFILE



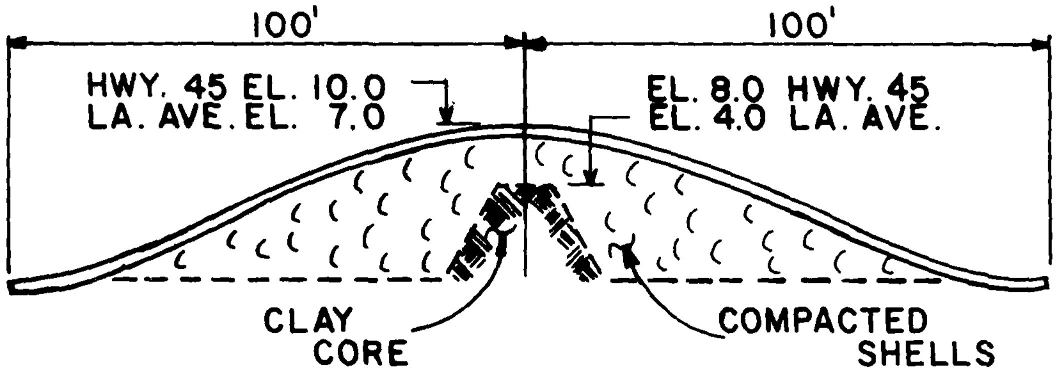
PLAN

WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

WATER EXCHANGE STRUCTURE

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB. 1984 FILE NO. H-2-29663



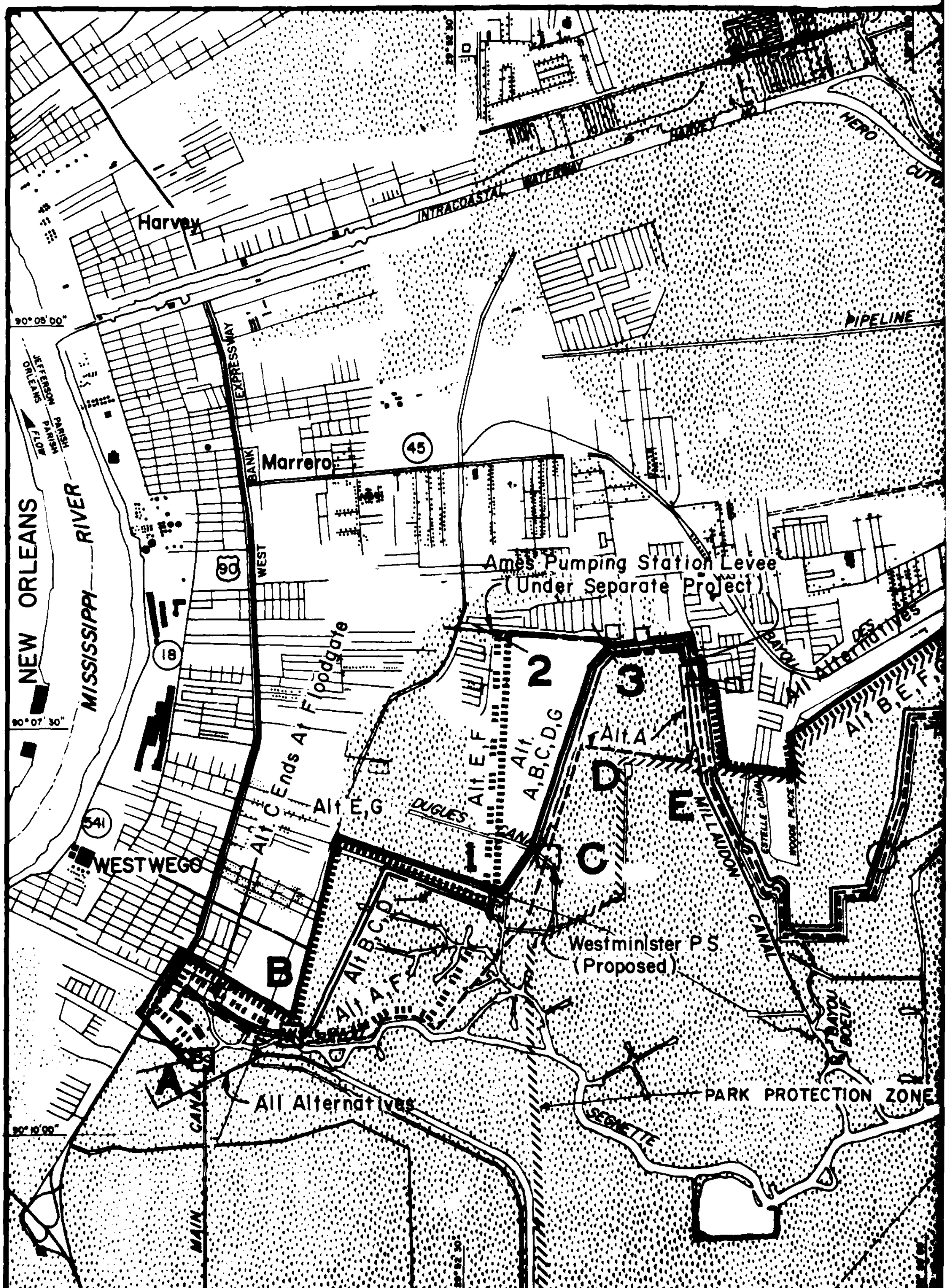
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

TYPICAL ROADWAY RAMP

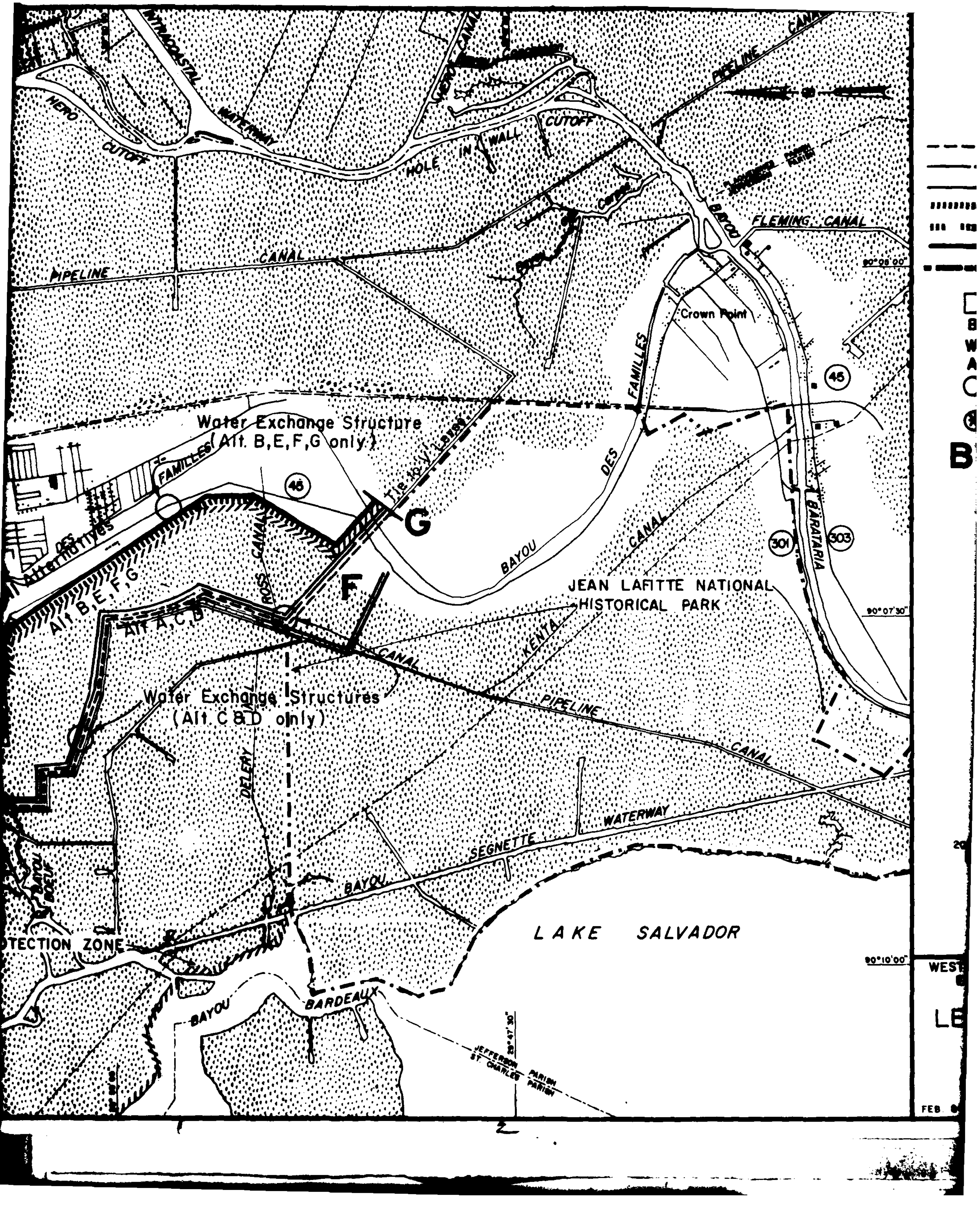
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB 1984 FILE NO. H-2-29663

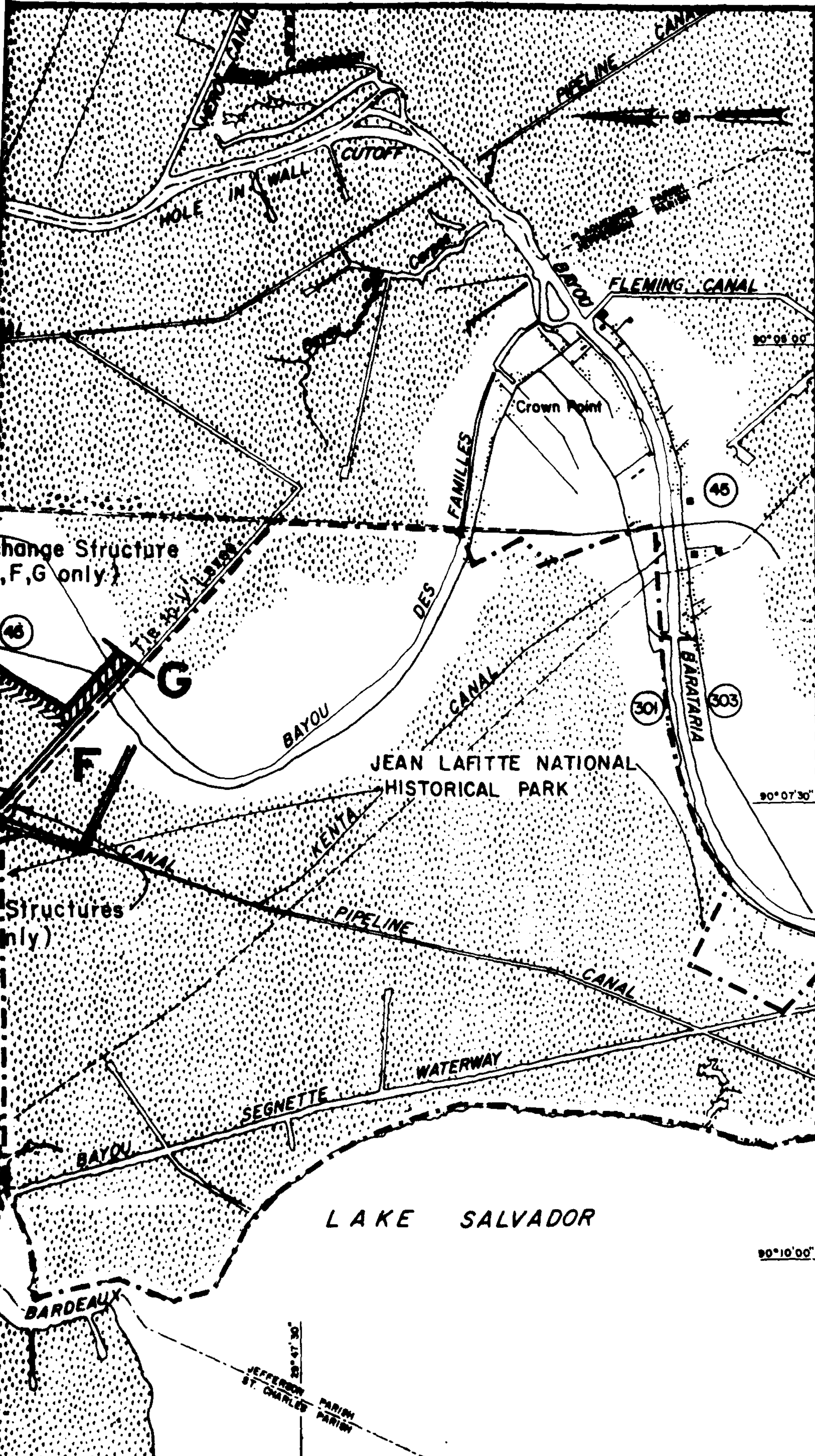
PLATE 4



Harvey
INTRACOASTAL WATERWAY
HARVEY
HERO
PIPELINE
90°05'00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
NEW ORLEANS
MISSISSIPPI RIVER
WEST BANK EXPRESSWAY
Marrero
45
90
18
541
90°07'30"
Ames Pumping Station Levee
(Under Separate Project)
All Alternatives
Alt. C Ends At Floodgate
Alt. E, G
DUGUES CANAL
Alt. E, F
Alt. A, B, C, D, G
Alt. A
Alt. B, E, F, G
2
3
1
A
B
C
D
E
WESTWEGO
Alt. B, C, D
Alt. A, F
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE
BAYOU DES
Westminister P.S.
(Proposed)
BAYOU BOEUF
PARK PROTECTION ZONE
SEGNETTE
All Alternatives
90°10'00"
MAIN CANAL



INTRACOASTAL
WATERWAY
HERO CUTOFF
HERO CANAL
HOLE IN WALL
CUTOFF
PIPELINE CANAL
PIPELINE
CANAL
BAYOU
FLEMING CANAL
Crown Point
FAMILLES
DES
BAYOU
45
Water Exchange Structure
(Alt. B,E,F,G only)
FAMILLES
DES
Alternatives
Alt. B,E,F,G
Alt. A,C,D
Tie-In Levee
G
F
ROSS CANAL
CANAL
JEAN LAFITTE NATIONAL
HISTORICAL PARK
KENTA
CANAL
PIPELINE
CANAL
BARATARIA
301
303
Water Exchange Structures
(Alt. C & D only)
DELERY
WATERWAY
SEGNETTE
BAYOU
BAYOU BOEUF
TECTION ZONE
LAKE SALVADOR
BAYOU
BARDEAUX
JEFFERSON PARISH
ST. CHARLES PARISH
90°05'00"
90°07'30"
90°10'00"
WEST
FEB.



LEGEND

- ALT. A ALINEMENT
- ALT. B ALINEMENT
- ALT. C & D ALINEMENT
- ALT. E ALINEMENT
- ALT F ALINEMENT
- ALT. G ALINEMENT
- AMES P.S. LEVEE (Separate Project)
- PUMPING STATIONS
- B_S - BAYOU SEGNETTE
- W WESTWEGO
- A AMES
- WATER EXCHANGE STRUCTURE
- NAVIGATION FLOODGATE
- B LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

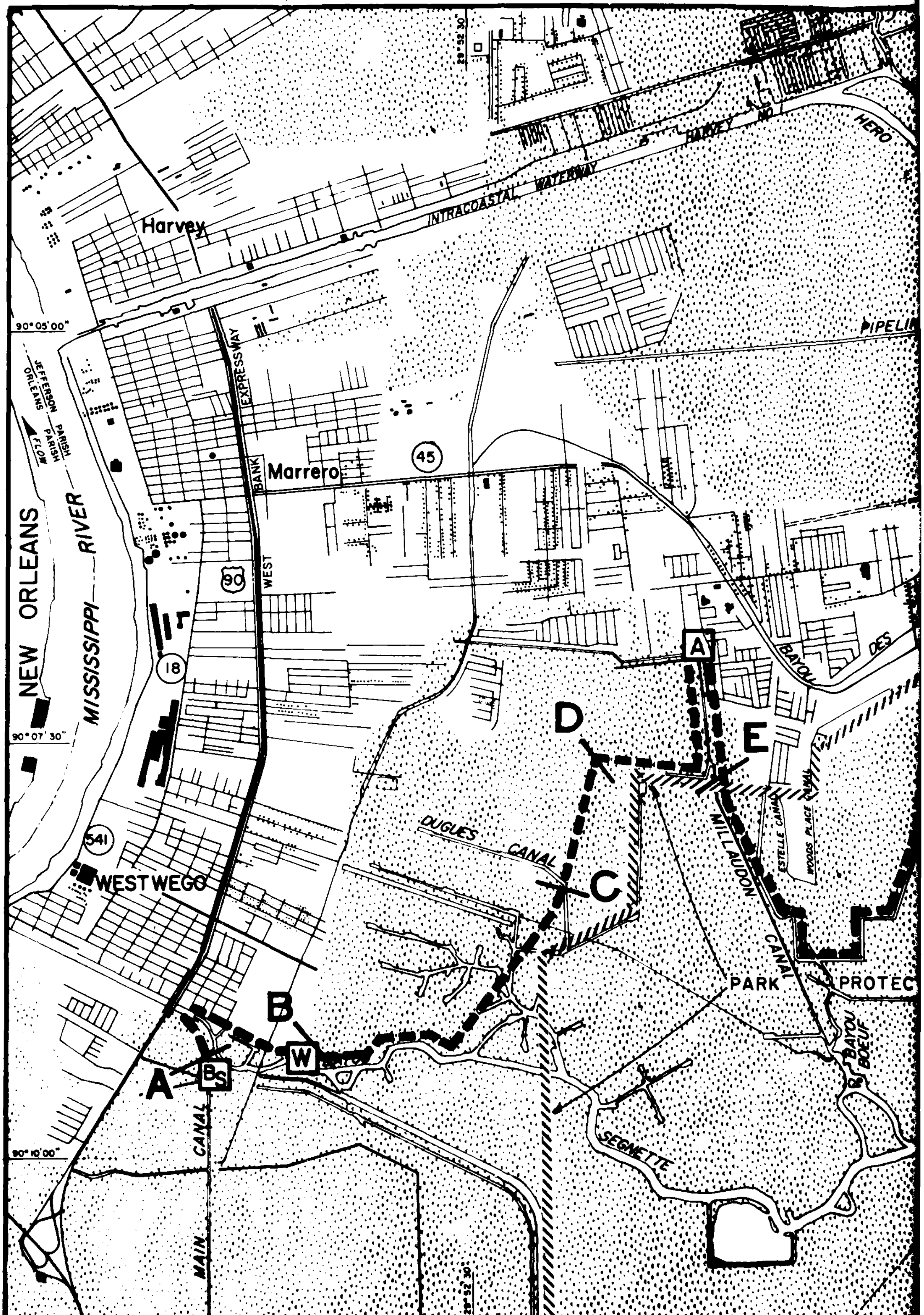
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

LEVEE ALTERNATIVE ALINEMENTS

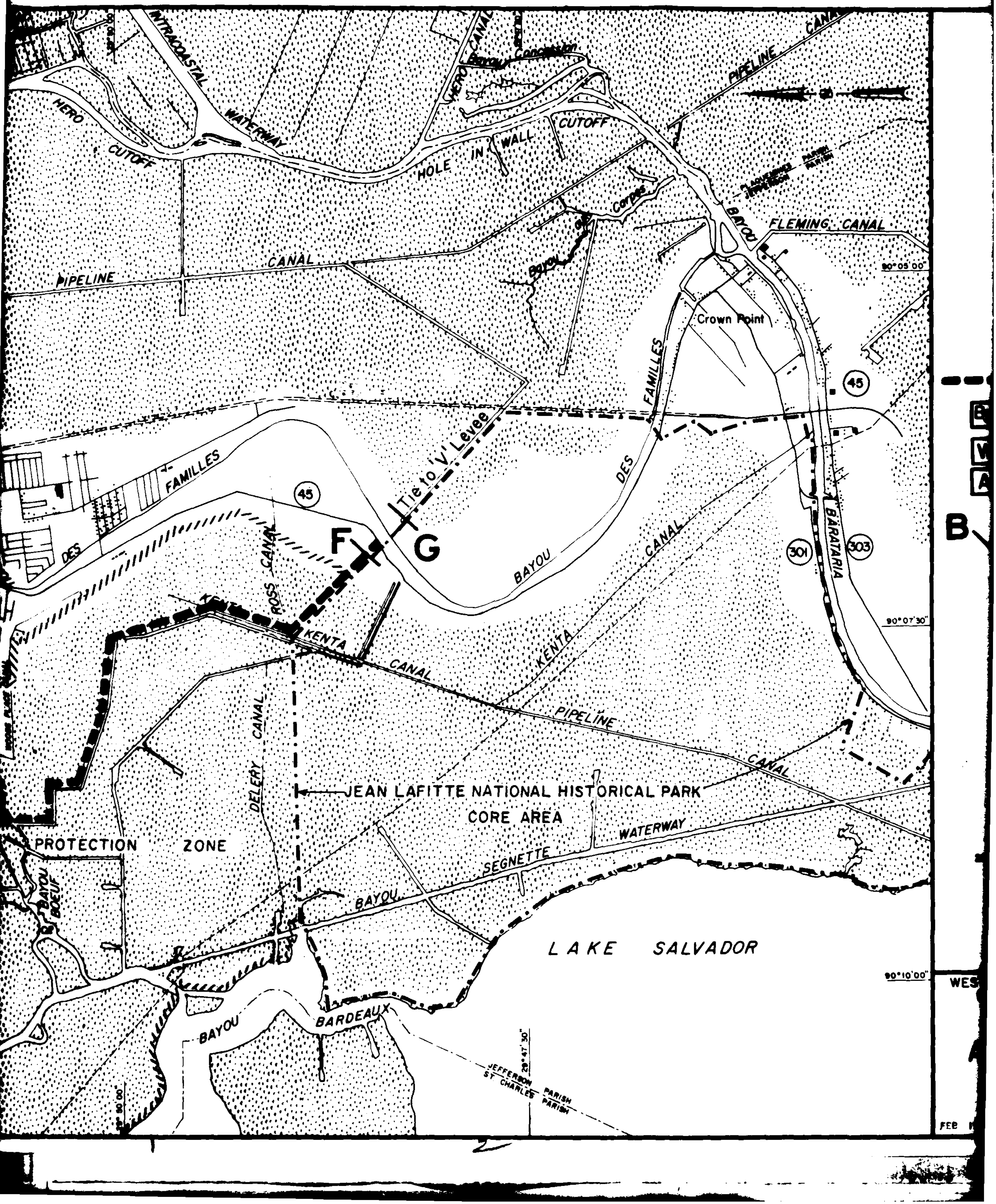
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

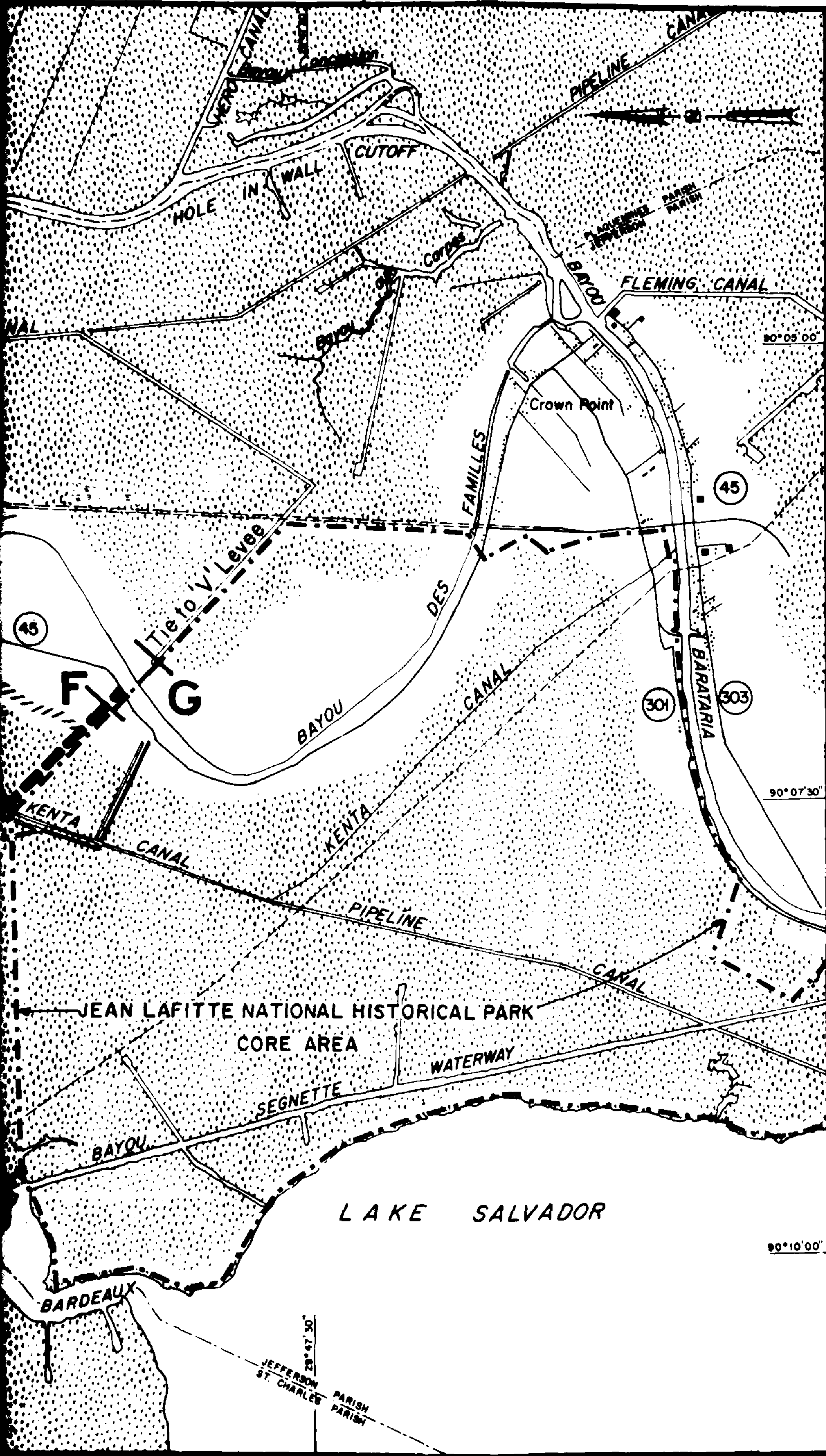
FEB 84 H-2-2966

PLATE 5



Harvey
INTRACOASTAL WATERWAY
HARVEY
HERO
PIPELIN
EXPRESSWAY
WEST BANK
Marrero
45
90
18
541
JEFFERSON PARISH
ORLEANS PARISH
FLOW
NEW ORLEANS
MISSISSIPPI RIVER
WESTWEGO
90°05'00"
90°07'30"
90°10'00"
29°52'30
A
B
C
D
E
W
DUGUES CANAL
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE CANAL
BAYOU DES
PARK
PROTEC
BAYOU BOEUF
SEGNETTE
MAIN CANAL


INTRACOASTAL WATERWAY
HERO CUTOFF
HERO CANAL
Bayou Concession
PIPELINE CANAL
HOLE IN WALL CUTOFF
PLAQUEMINES PARISH
JEFFERSON PARISH
Bayou des Carpes
BAYOU
FLEMING CANAL
90°05'00"
CANAL
PIPELINE
Crown Point
FAMILLES
45
Tie to 'V' Levee
FAMILLES
DES
BAYOU
F
G
ROSS CANAL
KENTA
KENTA CANAL
KENTA CANAL
301
303
BARATARIA
B
90°07'30"
PIPELINE CANAL
DELERY CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
CORE AREA
PROTECTION ZONE
WATERWAY
SEGNETTE
BAYOU
BAYOU BOEUF
LAKE SALVADOR
90°10'00"
BAYOU BARDEAUX
29°47'30"
JEFFERSON PARISH
ST CHARLES PARISH
WES
FEB



LEGEND

- ALTERNATIVE A ALINEMENT
- BS – BAYOU SEGNETTE PUMPING STATION
- W – WESTWEGO PUMPING STATION
- A – AMES PUMPING STATION
- B – LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

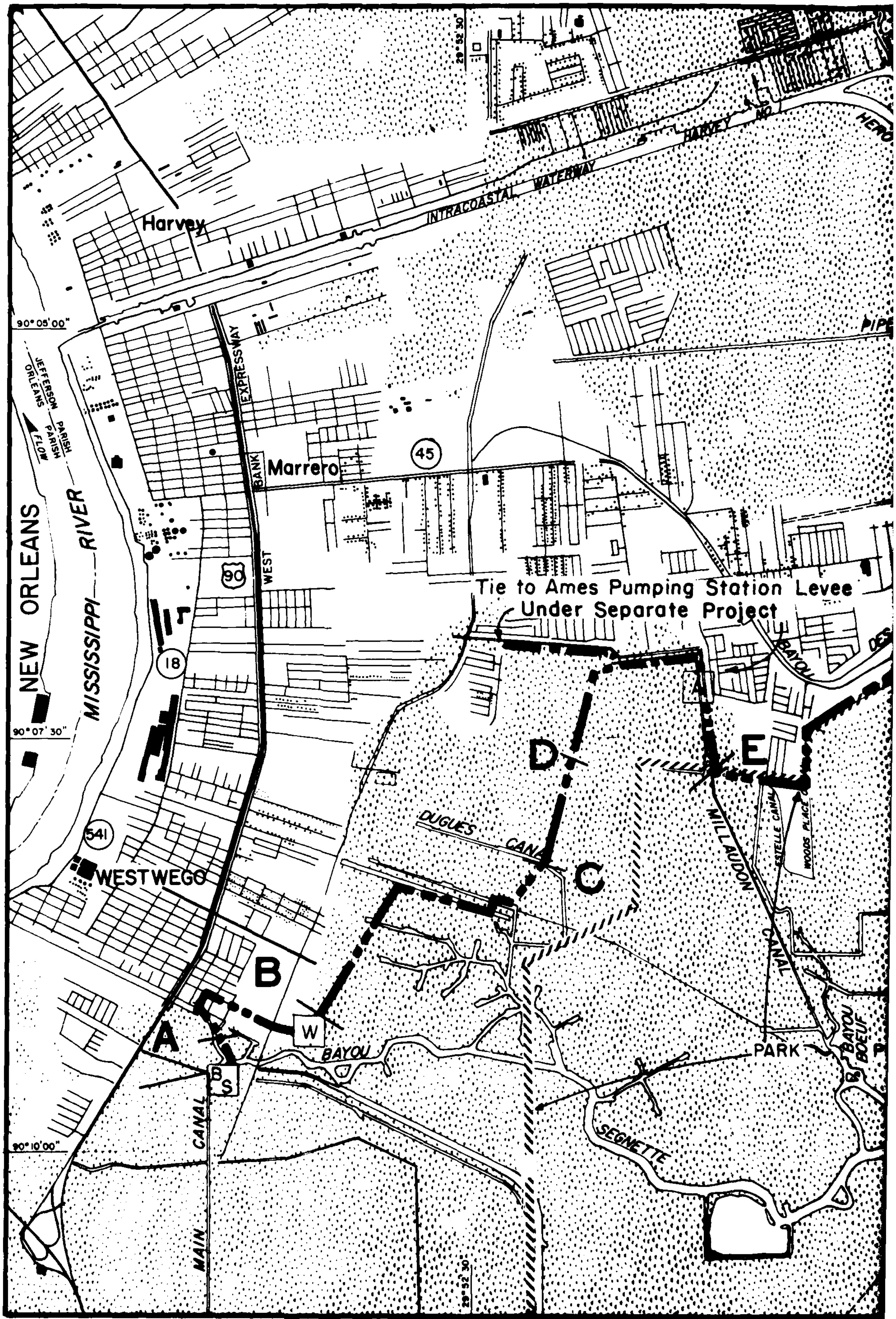
ALTERNATIVE A

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

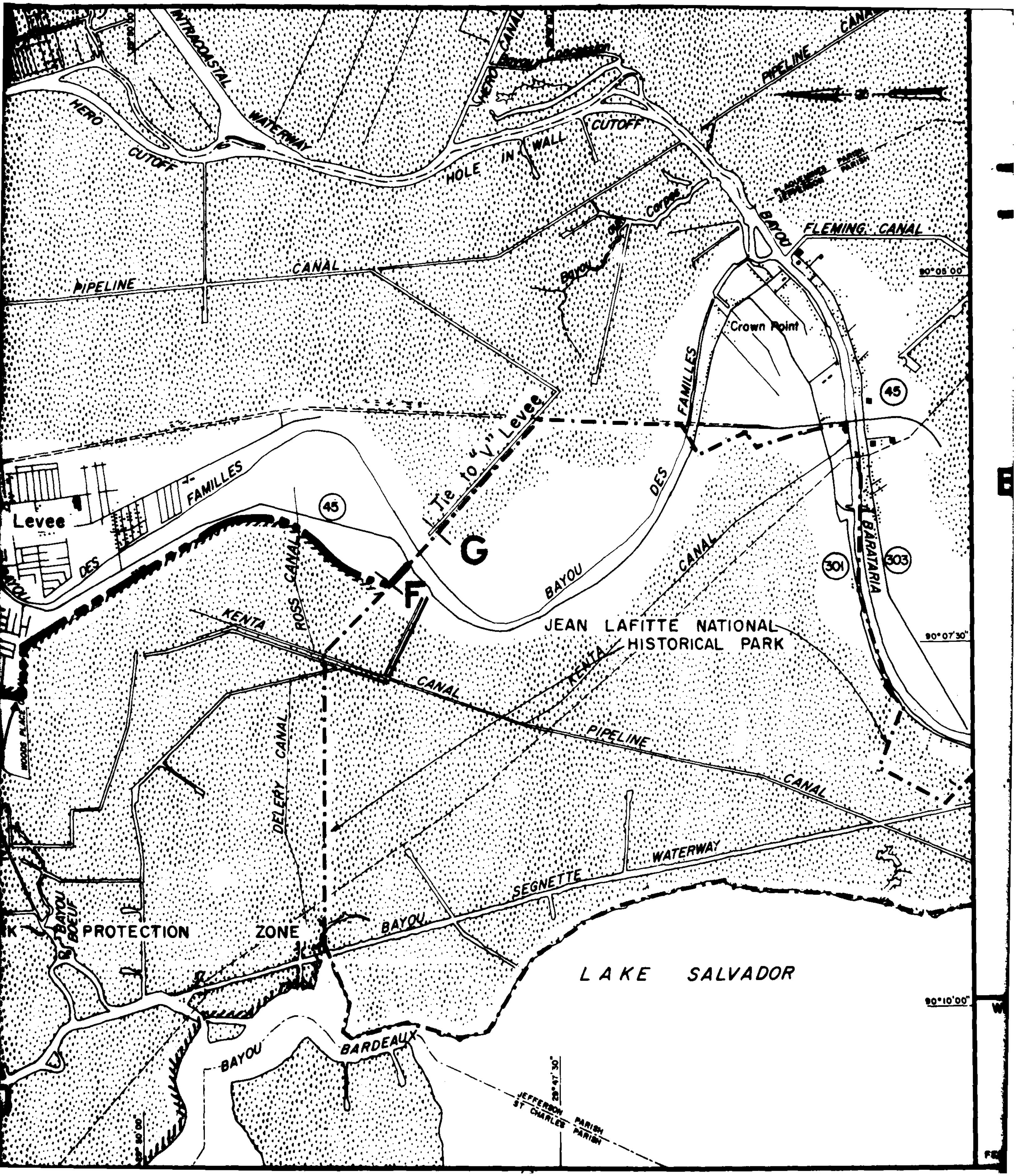
FEB 1984 FILE NO H-2-29663

2 1 3

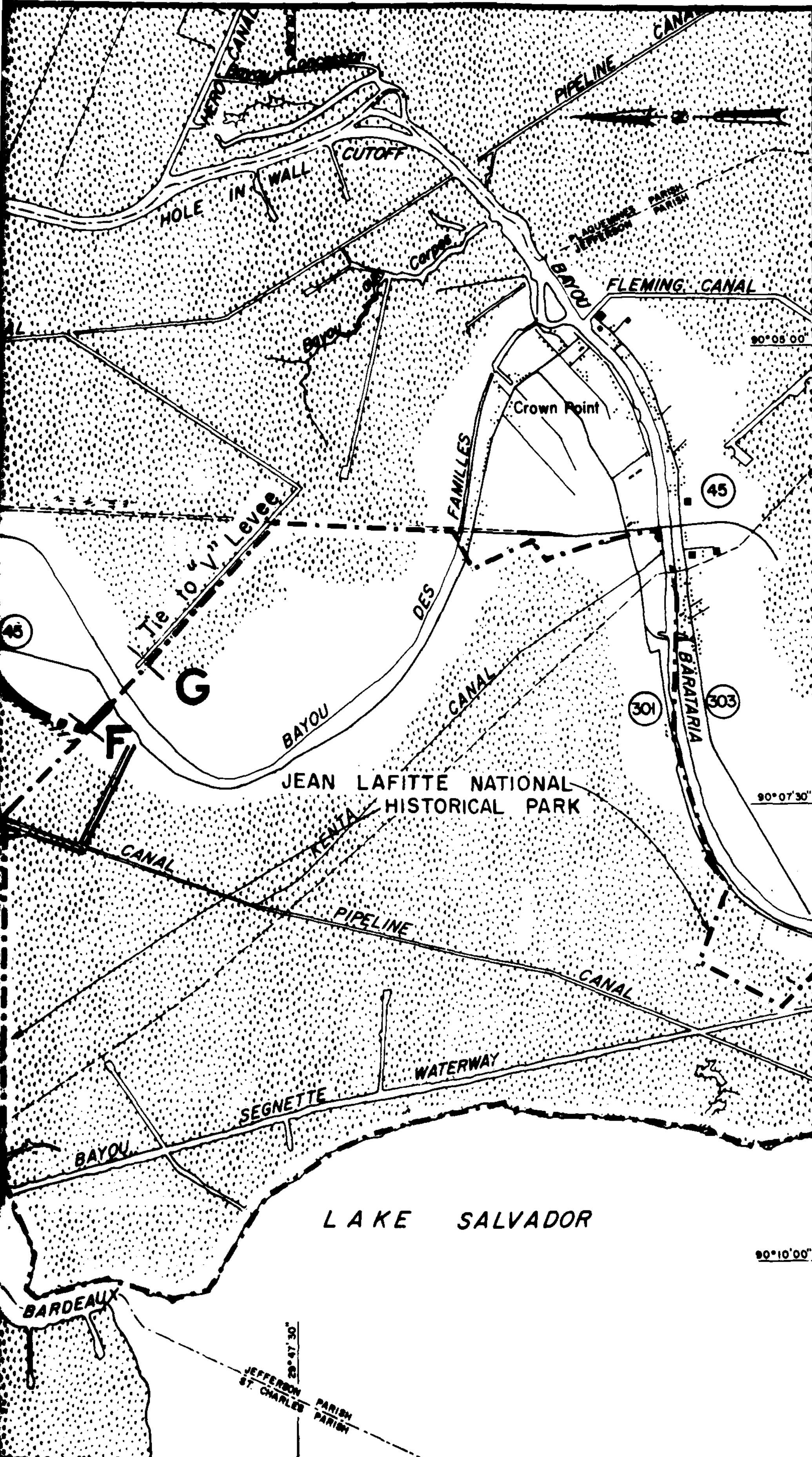
PLATE 6



Harvey
INTRACOASTAL WATERWAY
HARVEY NO
90°05'00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
EXPRESSWAY
BANK
WEST
Marrero
45
NEW ORLEANS
MISSISSIPPI RIVER
90
18
Tie to Ames Pumping Station Levee
Under Separate Project
BAYOU
90°07'30"
D
E
DUGUES CANAL
C
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE
541
WESTWEGO
B
A
W
BAYOU
B S
PARK
BAYOU BOEUF
SEGNETTE
MAIN CANAL
90°10'00"
29°52'30"
29°52'30"



INTRACOASTAL
WATERWAY
HERO CUTOFF
HERO CANAL
Bayou Concession
CUTOFF
HOLE IN WALL
PIPELINE CANAL
PLAQUEMINES PARISH
JEFFERSON PARISH
BAYOU
FLEMING CANAL
Bayou aux Carpes
PIPELINE
CANAL
90°05'00"
Crown Point
FAMILLES
45
Tie to "V" Levee
Levee
FAMILLES
DES
BAYOU
DES
45
G
F
BARATARIA
301
303
BAYOU
CANAL
JEAN LAFITTE NATIONAL
HISTORICAL PARK
KENTA
ROSS CANAL
KENTA
CANAL
90°07'30"
PIPELINE
CANAL
DELERY CANAL
WOODS PLACE
WATERWAY
SEGNETTE
BAYOU BOEUF
PROTECTION
ZONE
BAYOU
LAKE SALVADOR
90°10'00"
BAYOU
BARDEAUX
29°47'30"
JEFFERSON PARISH
ST CHARLES PARISH



LEGEND

ALTERNATIVE B ALINEMENT

AMES PUMPING STATION LEVEE (UNDER SEPARATE PROJECT)

B S — BAYOU SEGNETTE PUMPING STATION

W — WESTWEGO PUMPING STATION

A — AMES PUMPING STATION

B — LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

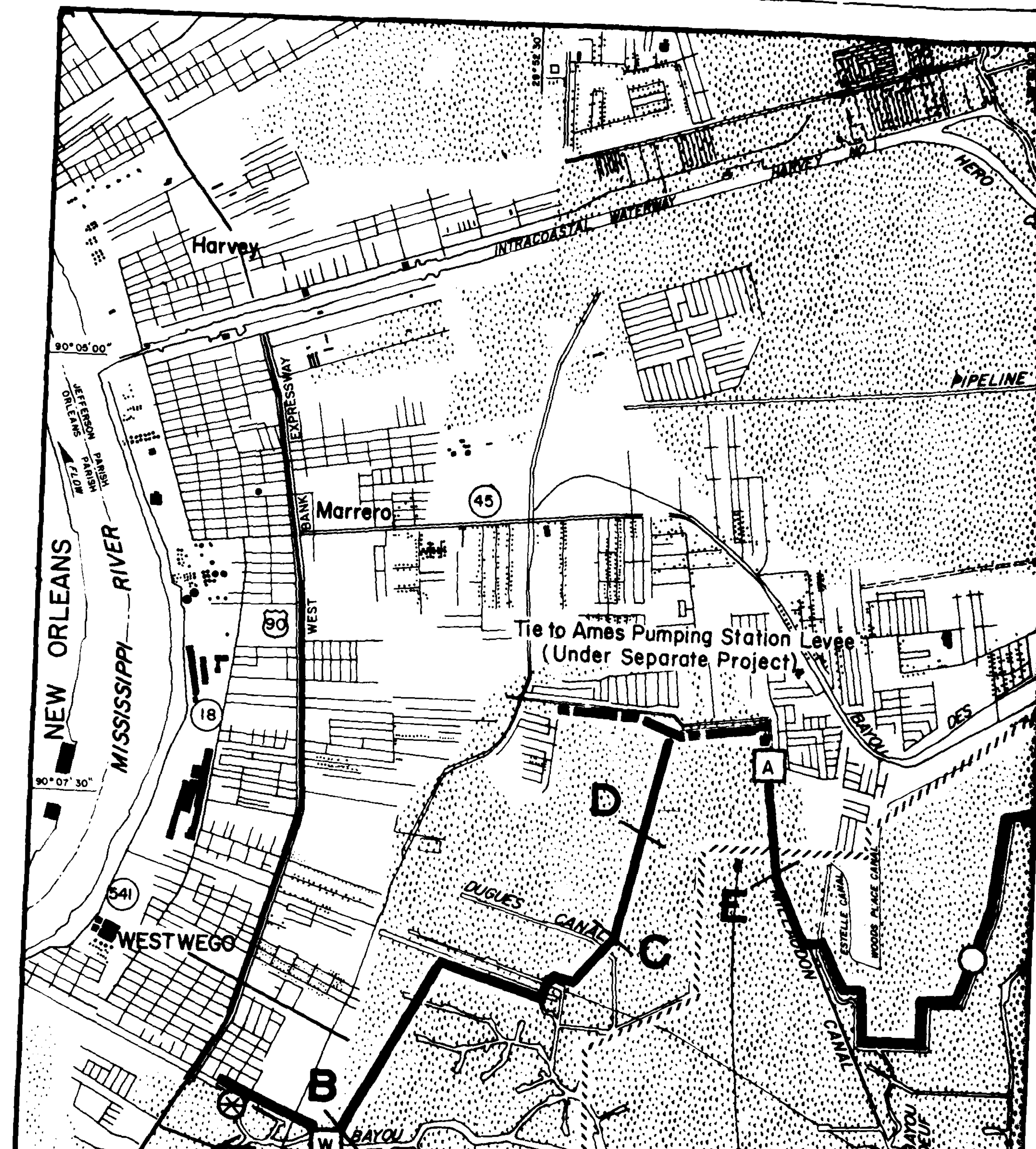
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE B

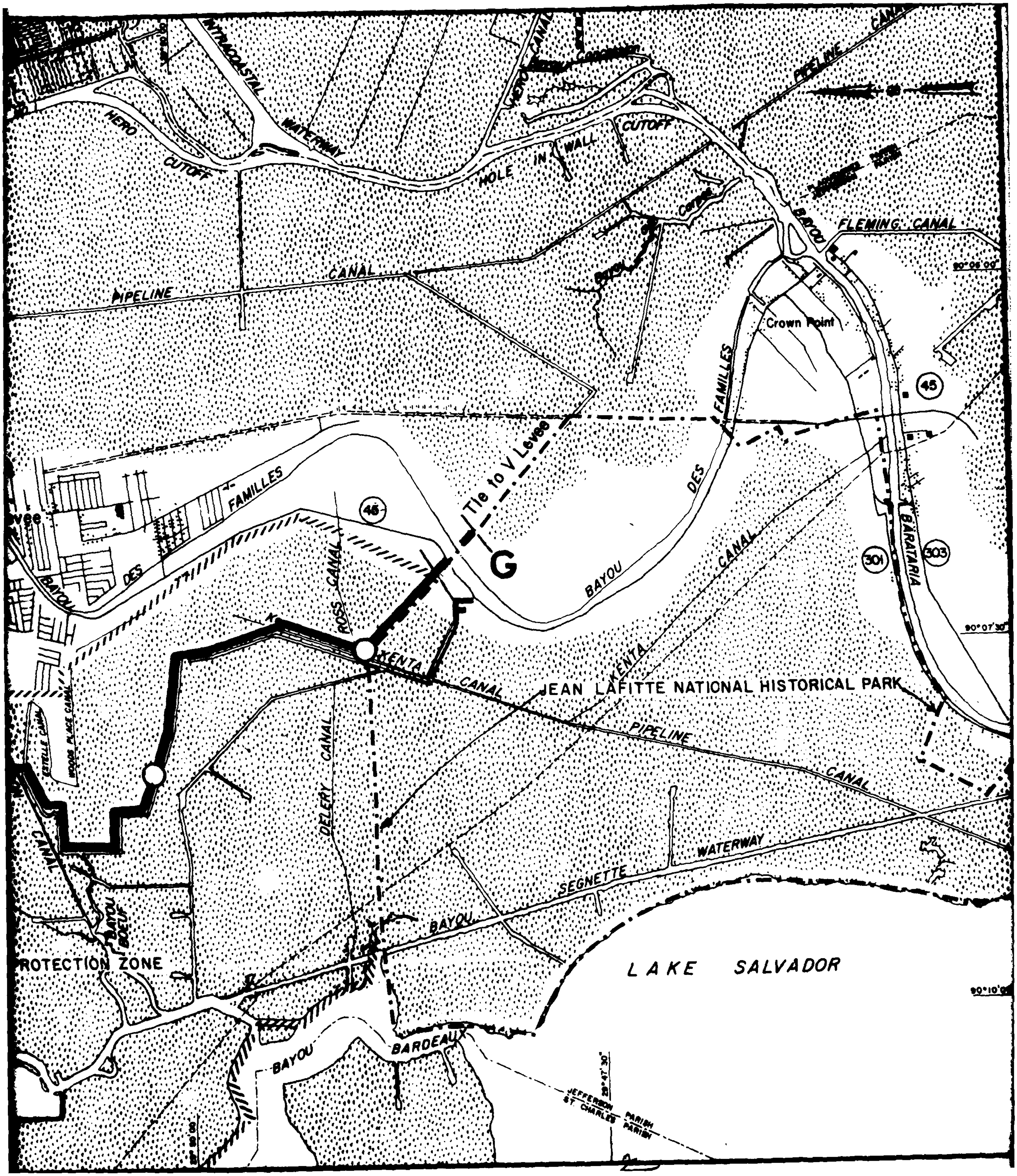
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

FEB 1984 FILE NO. H-2-29663

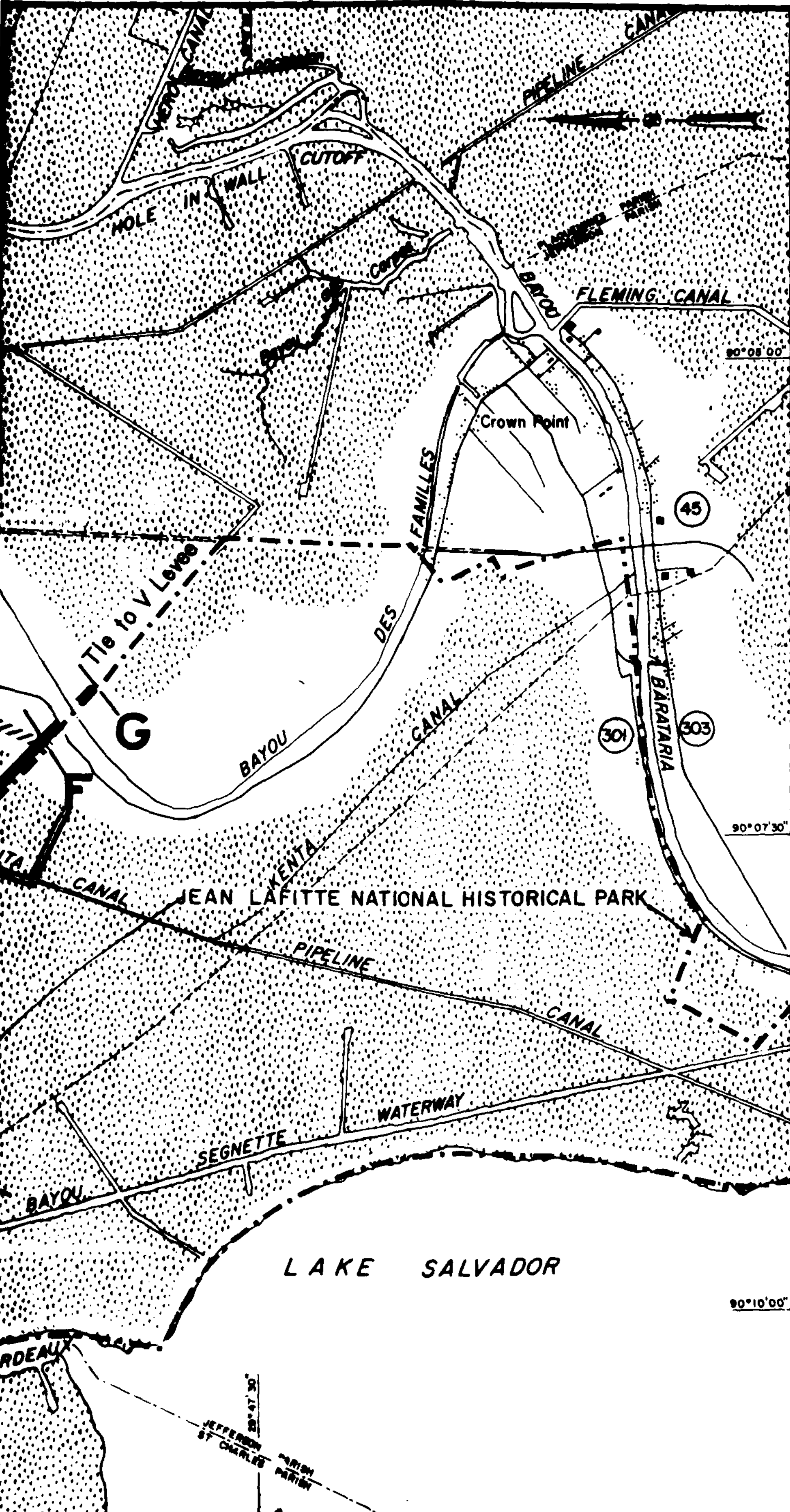
PLATE 7



Harvey
INTRACOASTAL WATERWAY
HARVEY
HERO
PIPELINE
JEFFERSON PARISH
ORLEANS PARISH
FLOW
NEW ORLEANS
MISSISSIPPI RIVER
EXPRESSWAY
WEST BANK
Marrero
45
90
18
541
WESTWEGO
90°05'00"
90°07'30"
90°10'00"
Tie to Ames Pumping Station Levee (Under Separate Project)
BAYOU DES
A
B
C
D
E
W
BS
DUGUES CANAL
ESTELLE CANAL
WOODS PLACE CANAL
CANAL
BAYOU
MAIN CANAL
SEGNETTE
BAYOU BOEUF
PARK PROTECTION ZONE



INTRACOASTAL
WATERWAY
HERO
CUTOFF
HERO CANAL
HOLE IN WALL
CUTOFF
PIPELINE
CANAL
FLEMING CANAL
Crown Point
BAYOU
DES
FAMILLES
Tie to V Levee
G
ROSS CANAL
KENTA
CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
PIPELINE
CANAL
DELERY CANAL
ESTELLE CANAL
WOODS PLACE CANAL
BARATARIA
301
303
45
WATERWAY
SEGNETTE
BAYOU
BAYOU BOEUF
ROTECTION ZONE
LAKE SALVADOR
BAYOU
BARDEAUX
JEFFERSON PARISH
ST. CHARLES PARISH
90°06'00"
90°07'30"
90°10'00"
29°47'30"



LEGEND

- ALTERNATIVE C ALINEMENT
- AMES PUMPING STATION LEVEE (UNDER SEPARATE PROJECT)
- B_S BAYOU SEGNETTE PUMPING STATION
- W WESTWEGO PUMPING STATION
- A AMES PUMPING STATION
- WATER EXCHANGE STRUCTURE
- B LEVEE REACH BOUNDARIES
- NAVIGATION FLOODGATE

SCALE IN FEET

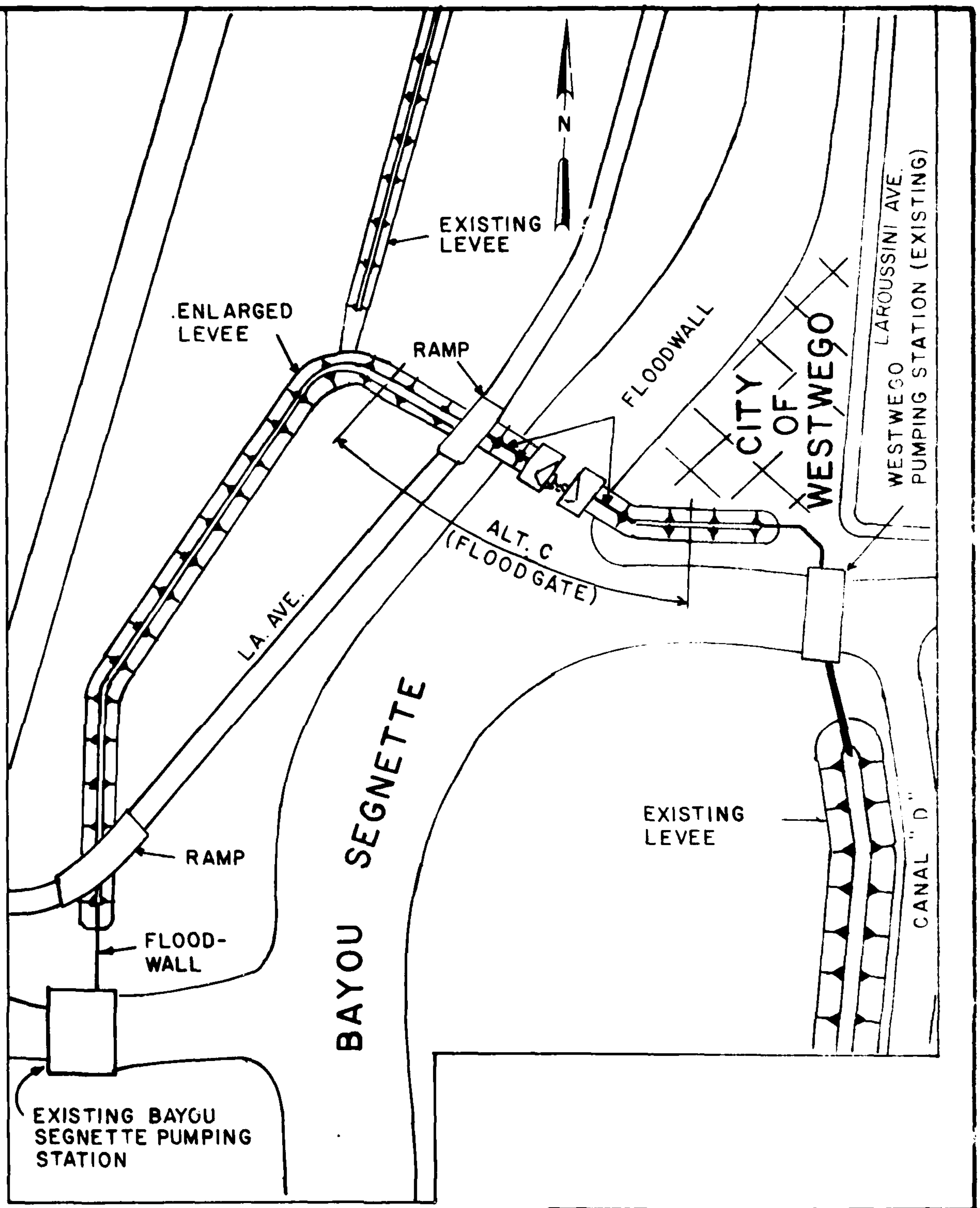
2000 0 2000 4000 6000

WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE C

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

FEB 1984 FILE NO H-2-29663



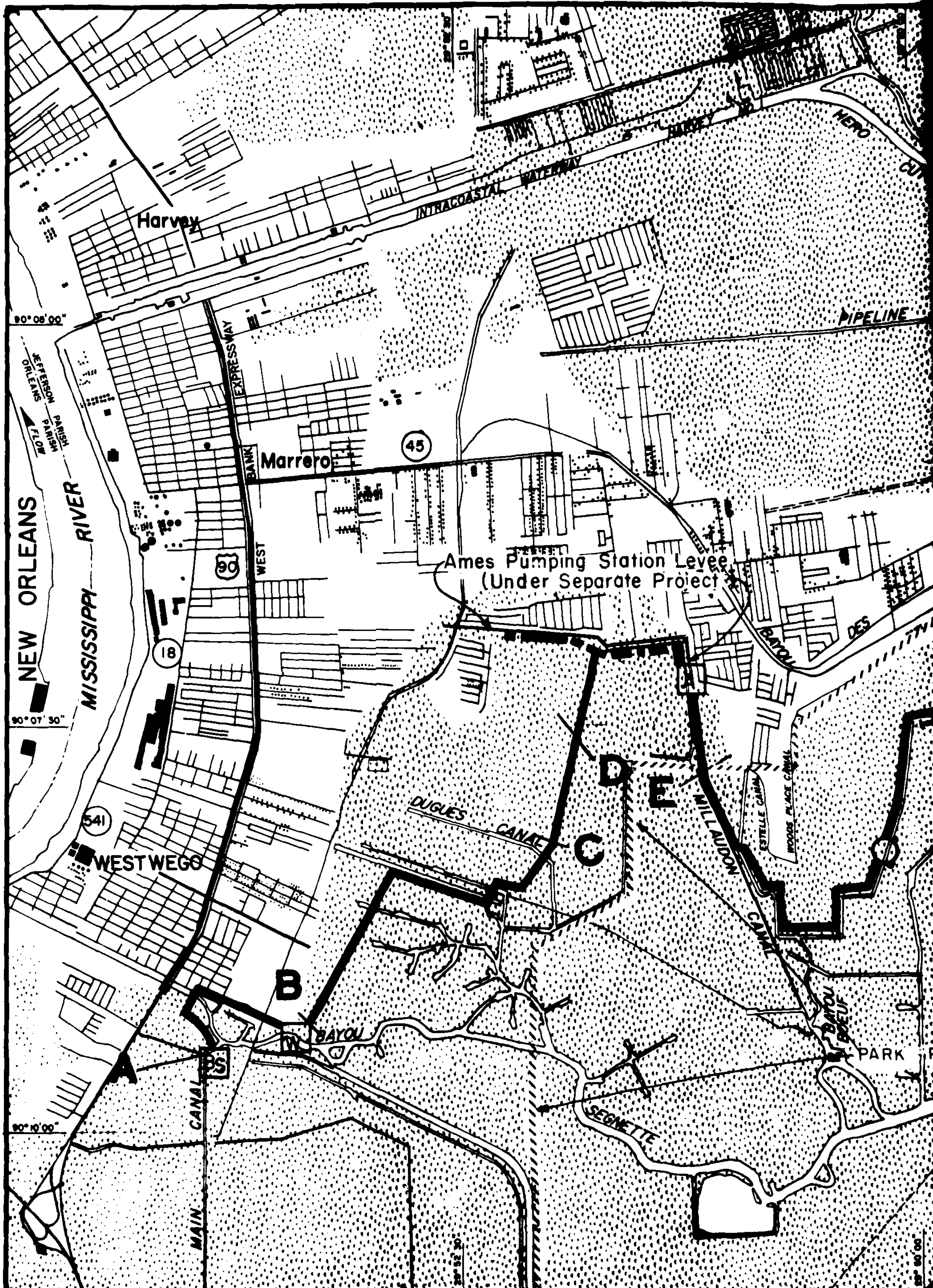
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

NAVIGATION FLOODGATE

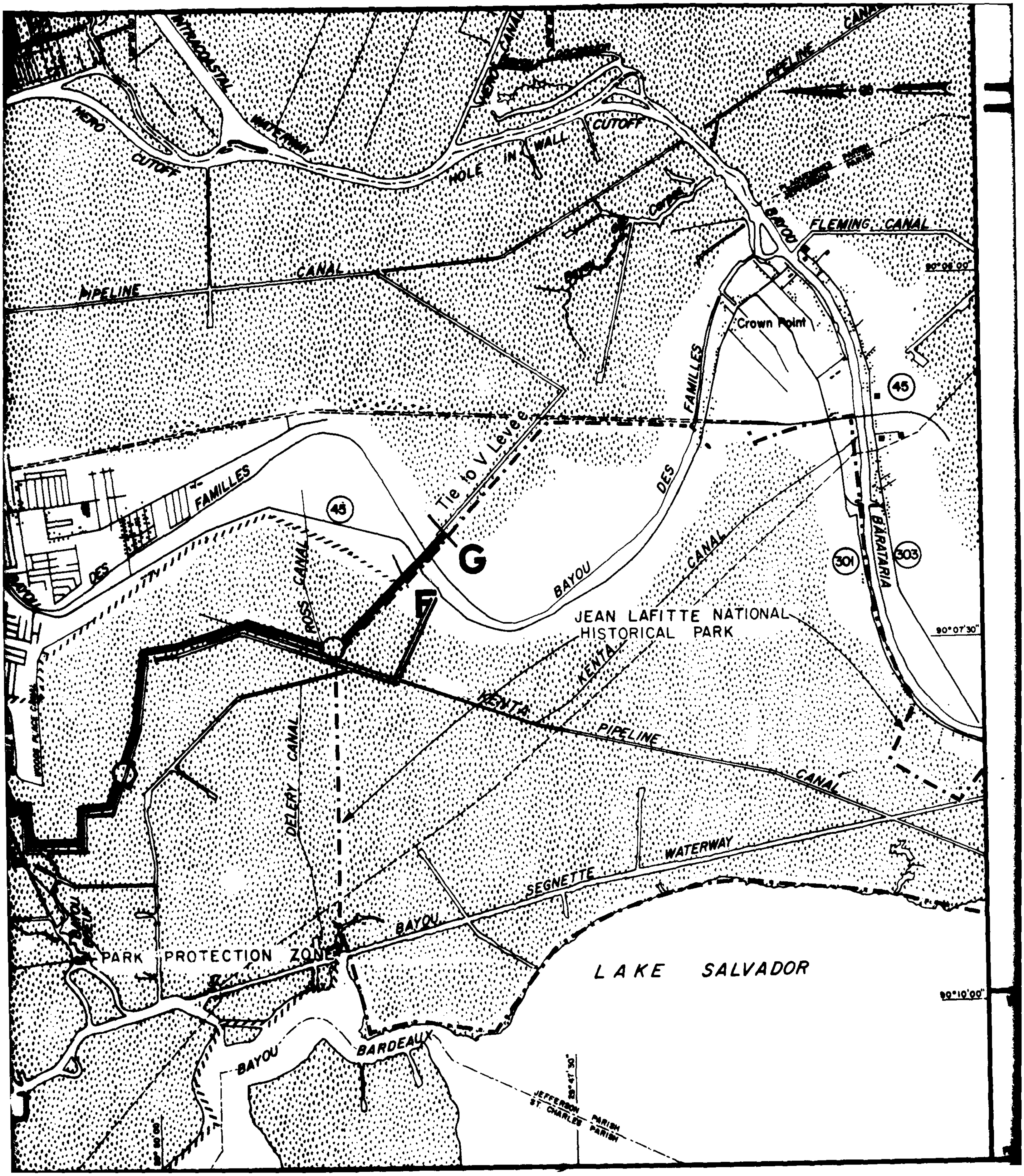
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB. 1984 FILE NO. H-2-29663

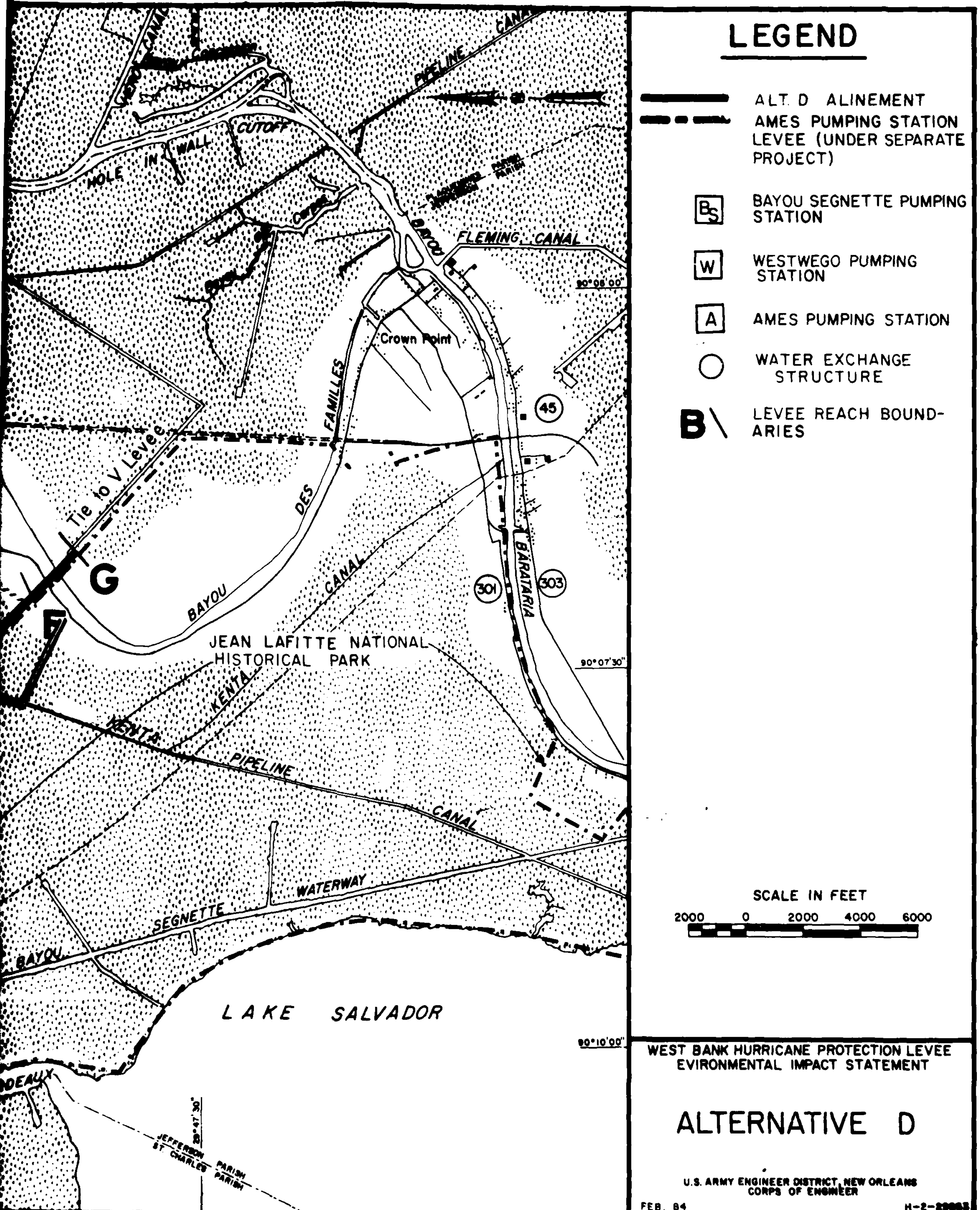
PLATE 9



Harvey
HARVEY
INTRACOASTAL WATERWAY
MERO
PIPELINE
90°08'00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
NEW ORLEANS
MISSISSIPPI RIVER
EXPRESSWAY
WEST BANK
Marrero
45
90
18
Ames Pumping Station Levee
(Under Separate Project)
BAYOU DES
90°07'30"
D
E
C
DUGUES CANAL
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE CANAL
541
WESTWEGO
B
A
BS
W
BAYOU
BAYOU BOEUF
PARK
SEGNETTE
90°10'00"
MAIN CANAL



INTRACOASTAL WATERWAY
METRO CUTOFF
HOLE IN WALL CUTOFF
PIPELINE CANAL
FLEMING CANAL
BAYOU
Crown Point
FAMILLES
BAYOU DES FAMILLES
Tie to V Levee
G
F
45
301
303
BARATARIA
ROSS CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
KENTA CANAL
KENTA PIPELINE CANAL
DELERY CANAL
SEGNETTE WATERWAY
BAYOU SEGNETTE
PARK PROTECTION ZONE
LAKE SALVADOR
BAYOU BARDEAUX
JEFFERSON PARISH
ST. CHARLES PARISH
90°05'00"
90°07'30"
90°10'00"



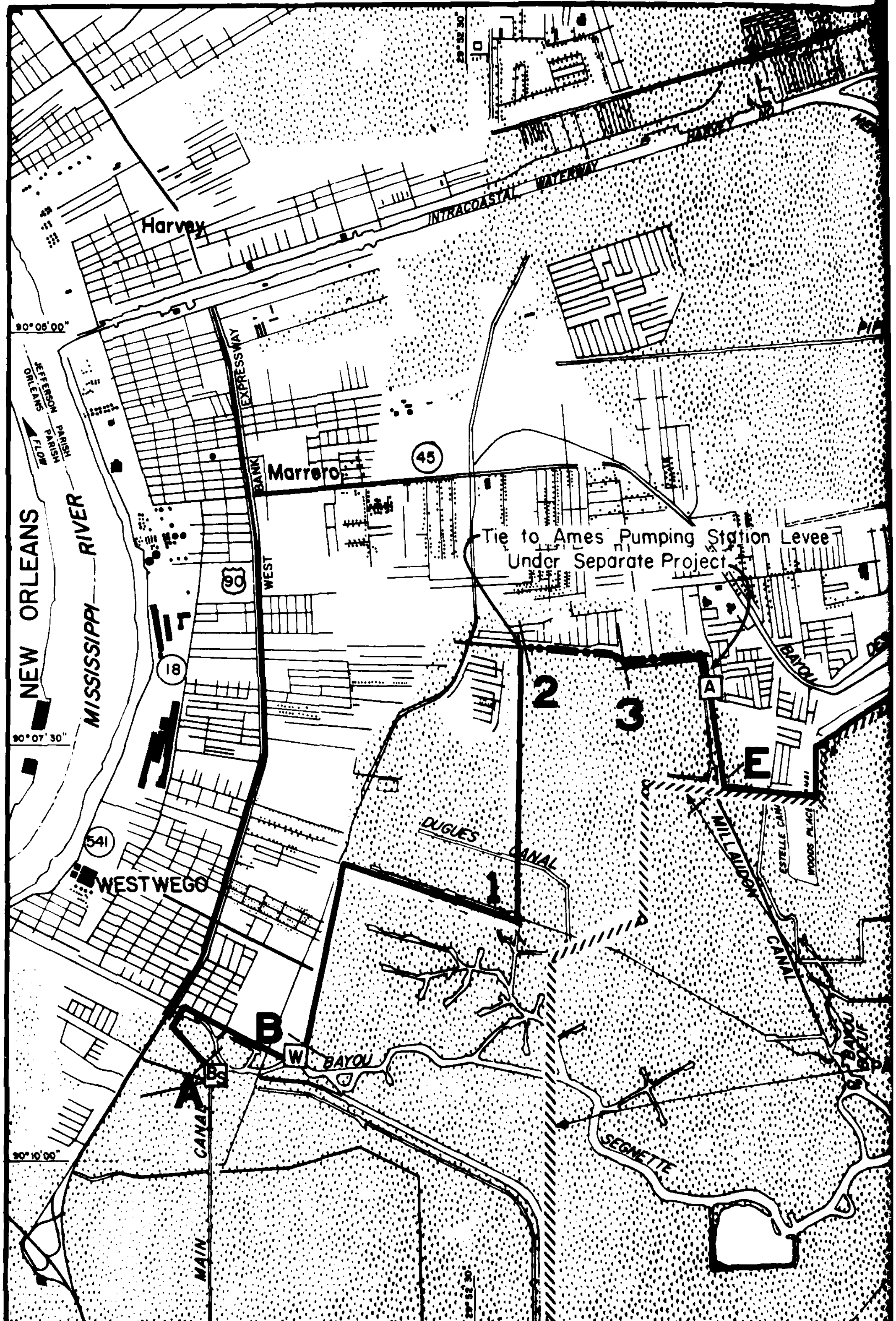
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE D

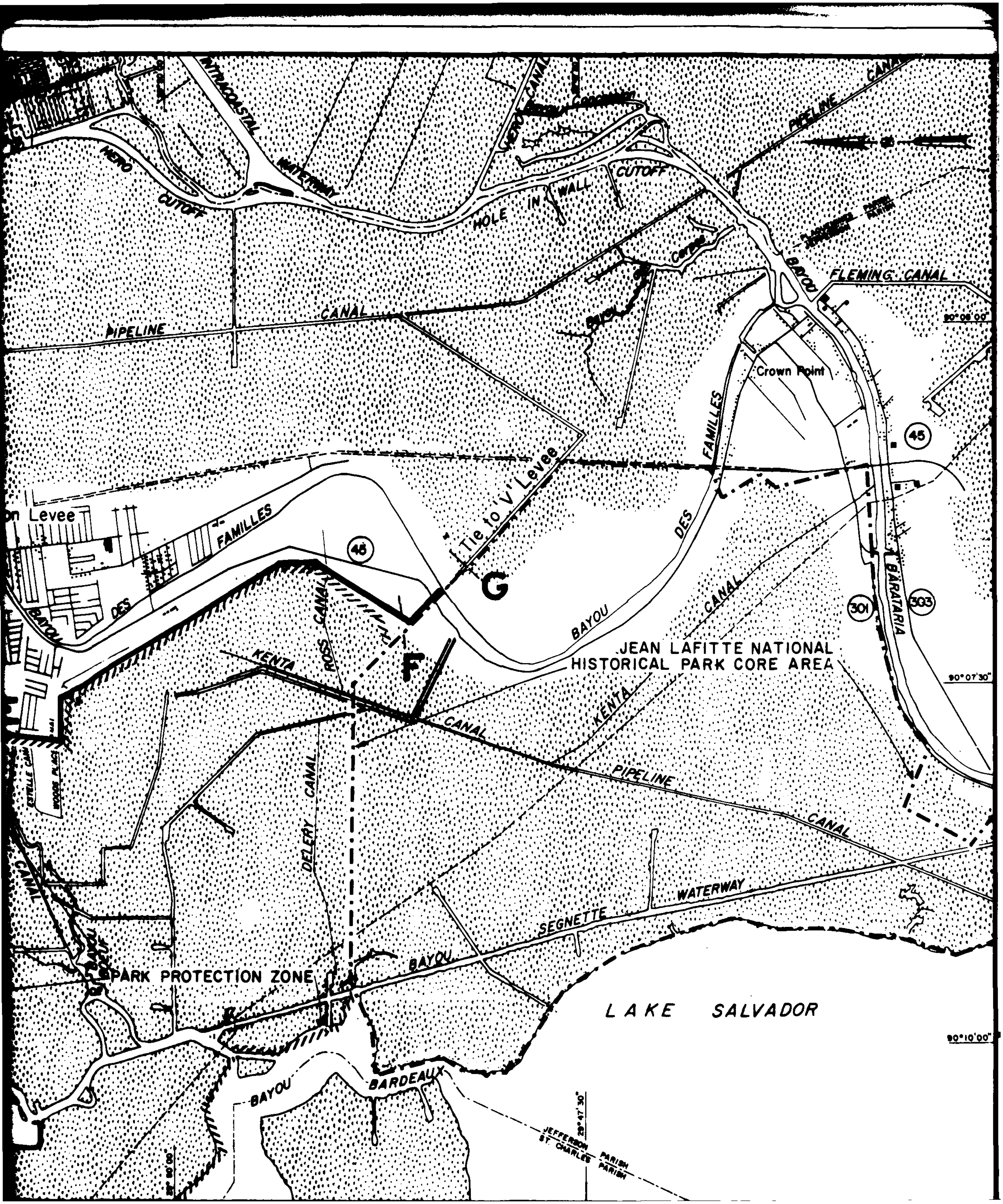
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

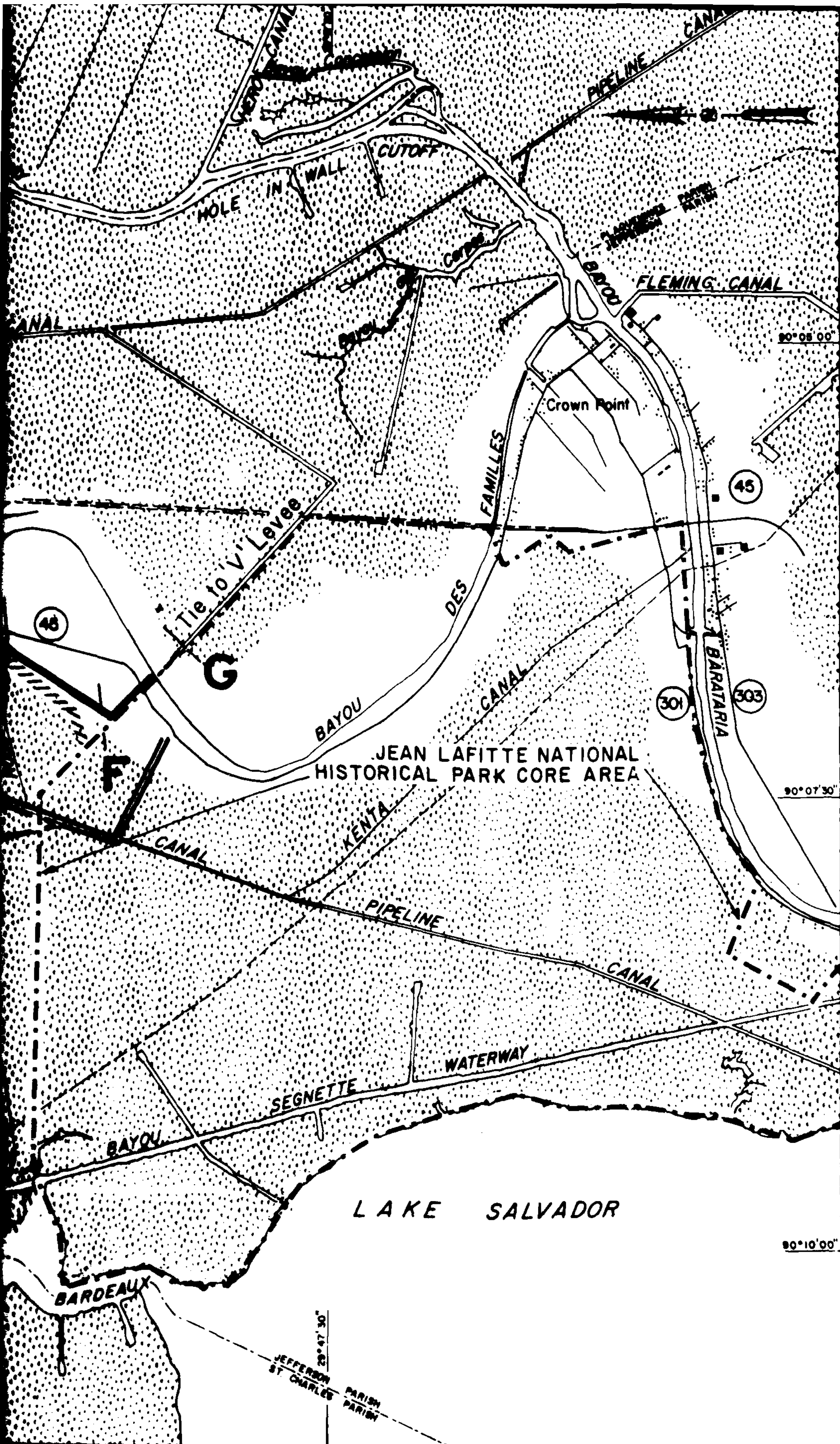
FEB. 84

PLATE 10



Harvey
INTRACOASTAL WATERWAY
HARVEY
EXPRESSWAY
WEST BANK
Marrero
45
90
18
541
WESTWEGO
NEW ORLEANS
MISSISSIPPI RIVER
JEFFERSON PARISH
ORLEANS PARISH
FLOW
90°05'00"
90°07'30"
90°10'00"
29°52'30
Tie to Ames Pumping Station Levee
Under Separate Project
A
E
2
3
1
B
W
Bs
DUGUES CANAL
MILLAUDON CANAL
BAYOU
SEGNETTE
MAIN CANAL
BAYOU BOEUF


INTRACOASTAL WATERWAY
HERO CUTOFF
HERO CANAL
HOLE IN WALL CUTOFF
PIPELINE CANAL
FLEMING CANAL
BAYOU
Crown Point
FAMILLES
BAYOU DES FAMILLES
Tie to 'V' Levee
G
F
45
301
303
BARATARIA
KENTA CANAL
ROSS CANAL
CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK CORE AREA
PIPELINE CANAL
DELERY CANAL
SEGNETTE WATERWAY
BAYOU SEGNETTE
PARK PROTECTION ZONE
LAKE SALVADOR
BAYOU BARDEAUX
JEFFERSON PARISH
ST. CHARLES PARISH
90°08'00"
90°07'30"
90°10'00"
29°47'30"
Levee
ESTELLE CANAL
WOODS PLACE



LEGEND

ALTERNATIVE E ALINEMENT

AMES PUMPING STATION LEVEE (UNDER SEPARATE PROJECT)

BS BAYOU SEGNETTE PUMPING STATION

W WESTWEGO PUMPING STATION

A AMES PUMPING STATION

1 LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

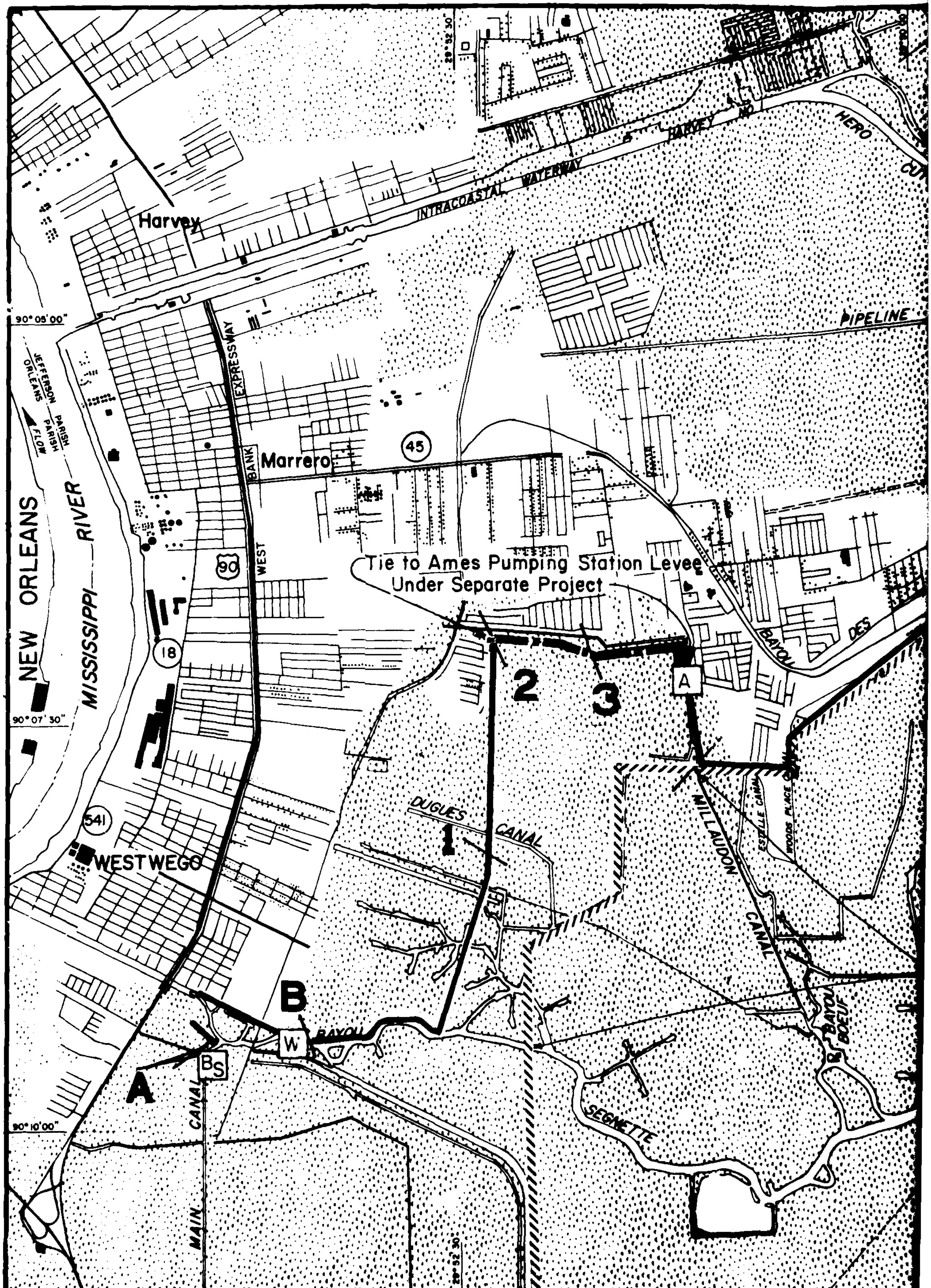
ALTERNATIVE E

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

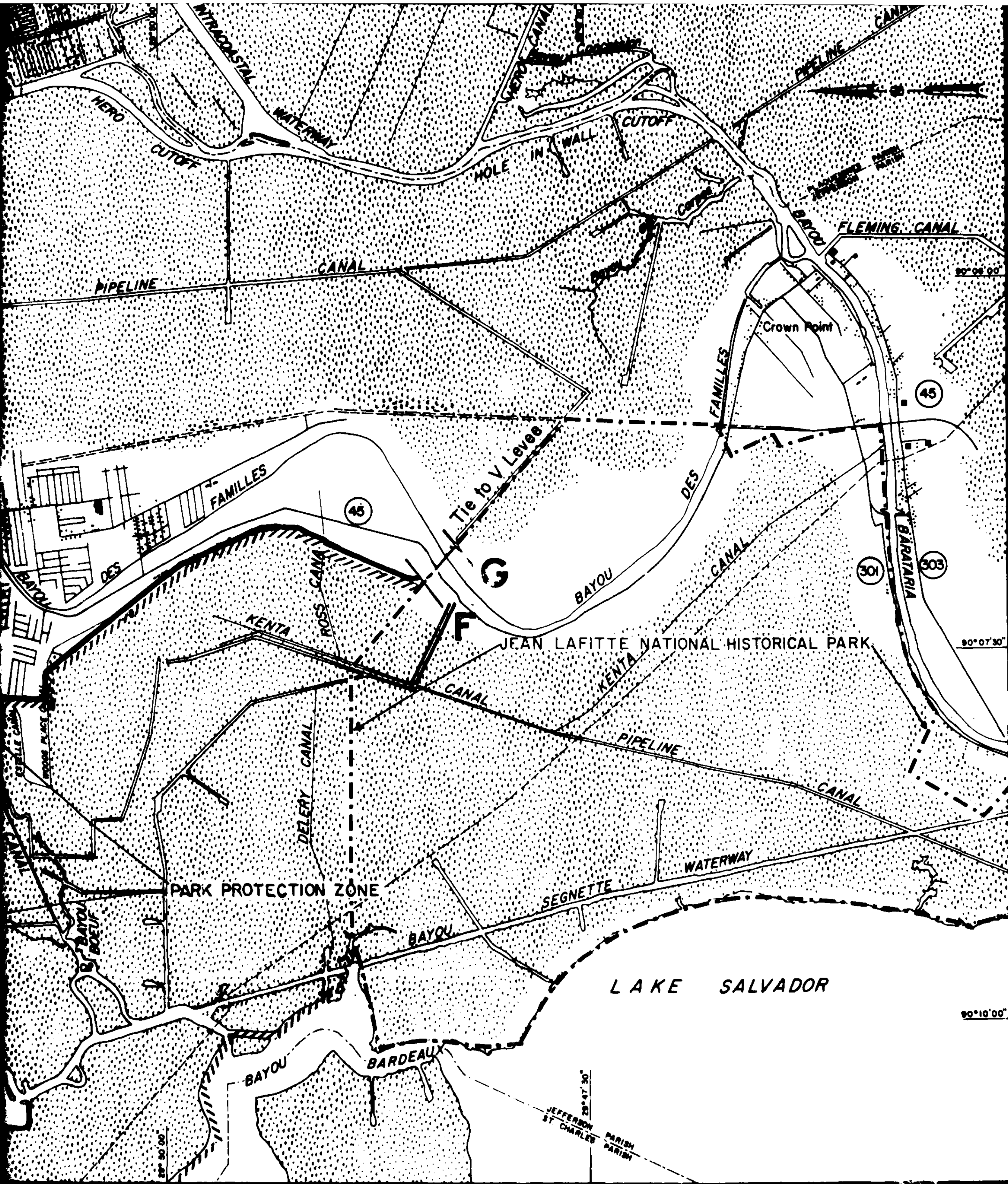
FEB. 84

H-2-29

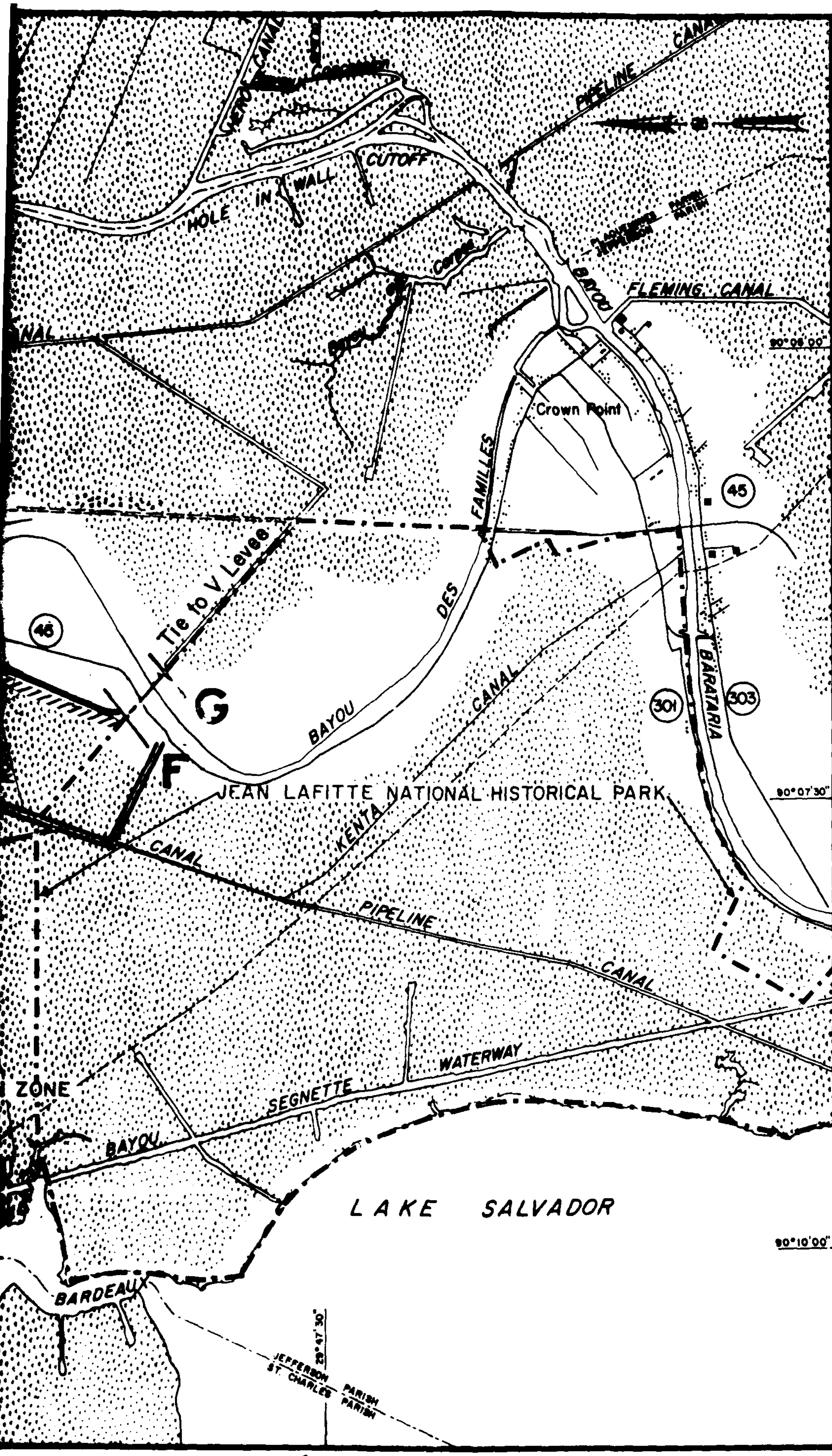
PLATE 11



Harvey
INTRACOASTAL WATERWAY
HARVEY
HERO
CUT
PIPELINE
EXPRESSWAY
WEST BANK
Marrero
45
90
18
541
NEW ORLEANS
MISSISSIPPI RIVER
JEFFERSON PARISH
ORLEANS PARISH
FLOW
90° 05' 00"
90° 07' 30"
90° 10' 00"
Tie to Ames Pumping Station Levee
Under Separate Project
2
3
A
1
DUGUES CANAL
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE CANAL
BAYOU DES
WESTWEGO
B
W
BAYOU
BS
A
MAIN CANAL
SEGNETTE
BAYOU BOEUF



INTRACOASTAL
WATERWAY
HERO
CUTOFF
HOLE IN WALL
CUTOFF
PIPELINE CANAL
PIPELINE
CANAL
FLEMING CANAL
BAYOU
Crown Point
FAMILLES
DES
BAYOU
45
Tie to V Levee
G
F
BAYOU
DES
FAMILLES
ROSS CANAL
KENTA
CANAL
KENTA
CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
PIPELINE
CANAL
301
303
BARATARIA
DELERY CANAL
WOODS PLACE CANAL
ESTELLE CANAL
CANAL
PARK PROTECTION ZONE
BAYOU BOEUF
WATERWAY
SEGNETTE
BAYOU
LAKE SALVADOR
BAYOU
BARDEAUX
JEFFERSON PARISH
ST CHARLES PARISH
90°06'00"
90°07'30"
90°10'00"
29°41'30"
29°30'00"



LEGEND

- ALTERNATIVE F ALINEMENT
- AMES PUMPING STATION LEVEE (UNDER SEPARATE PROJECT)
- BS — BAYOU SEGNETTE PUMPING STATION
- W — WESTWEGO PUMPING STATION
- A — AMES PUMPING STATION
- 1 \ LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

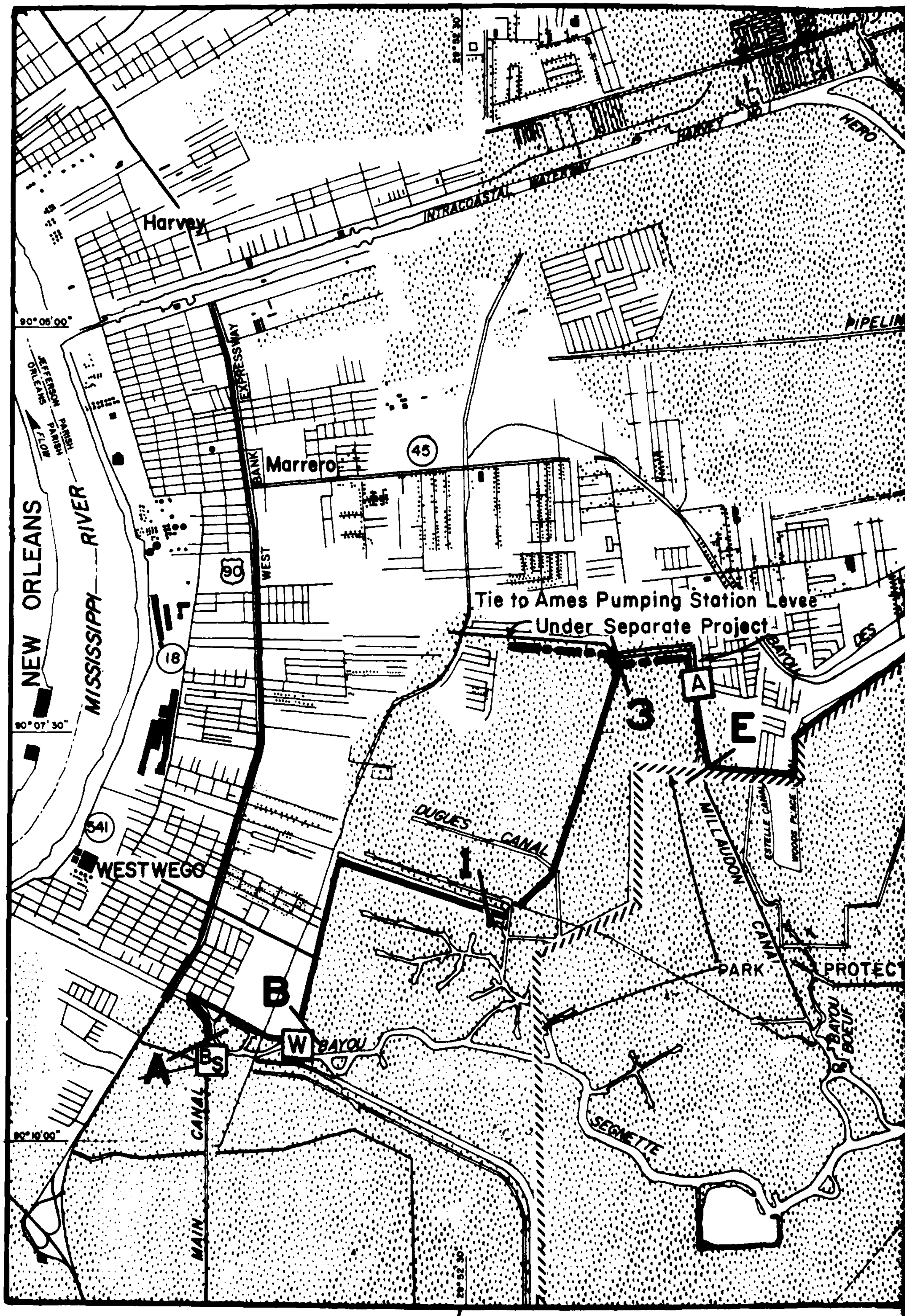
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE F

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

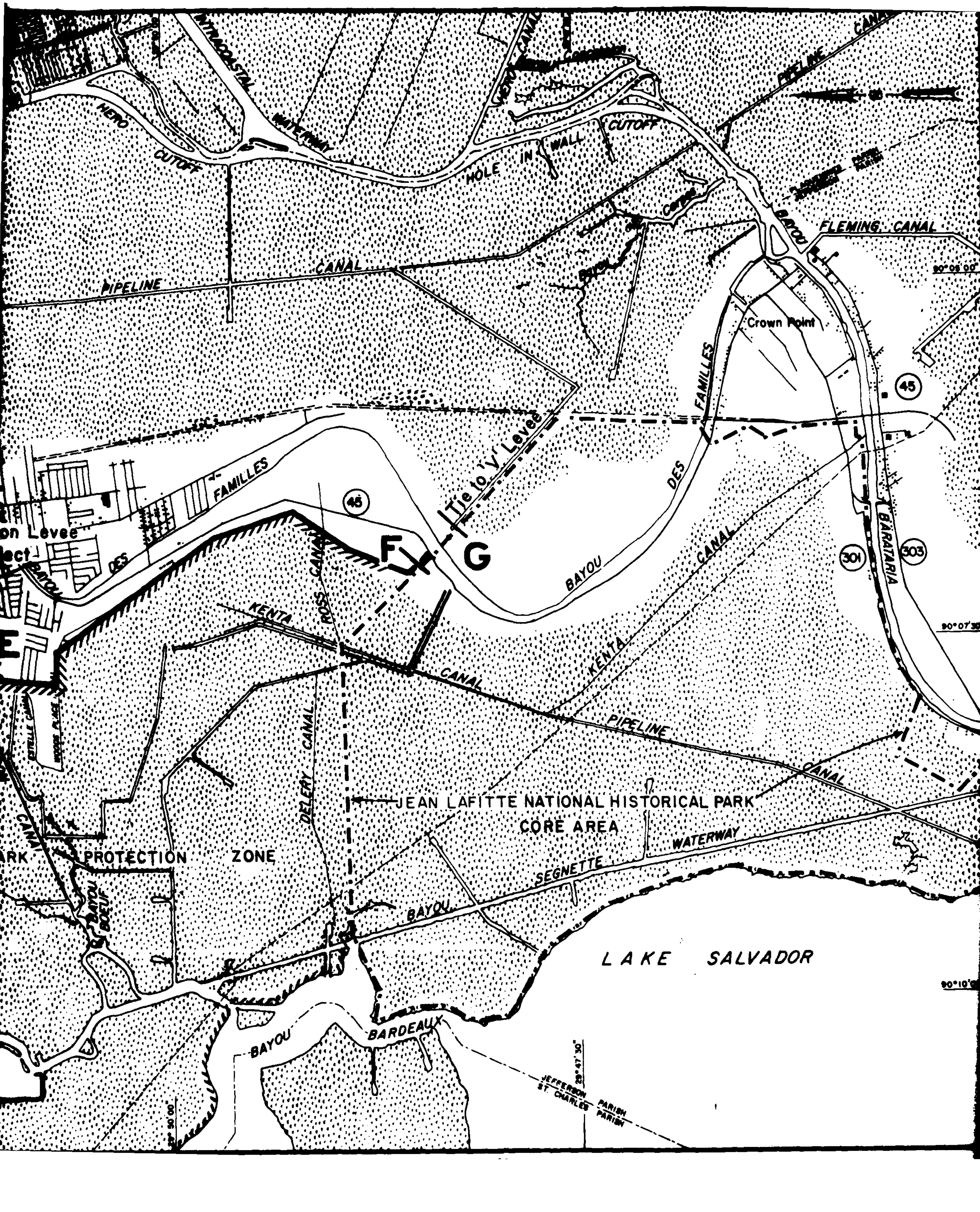
FEB. 84 H-2-2

PLATE 1

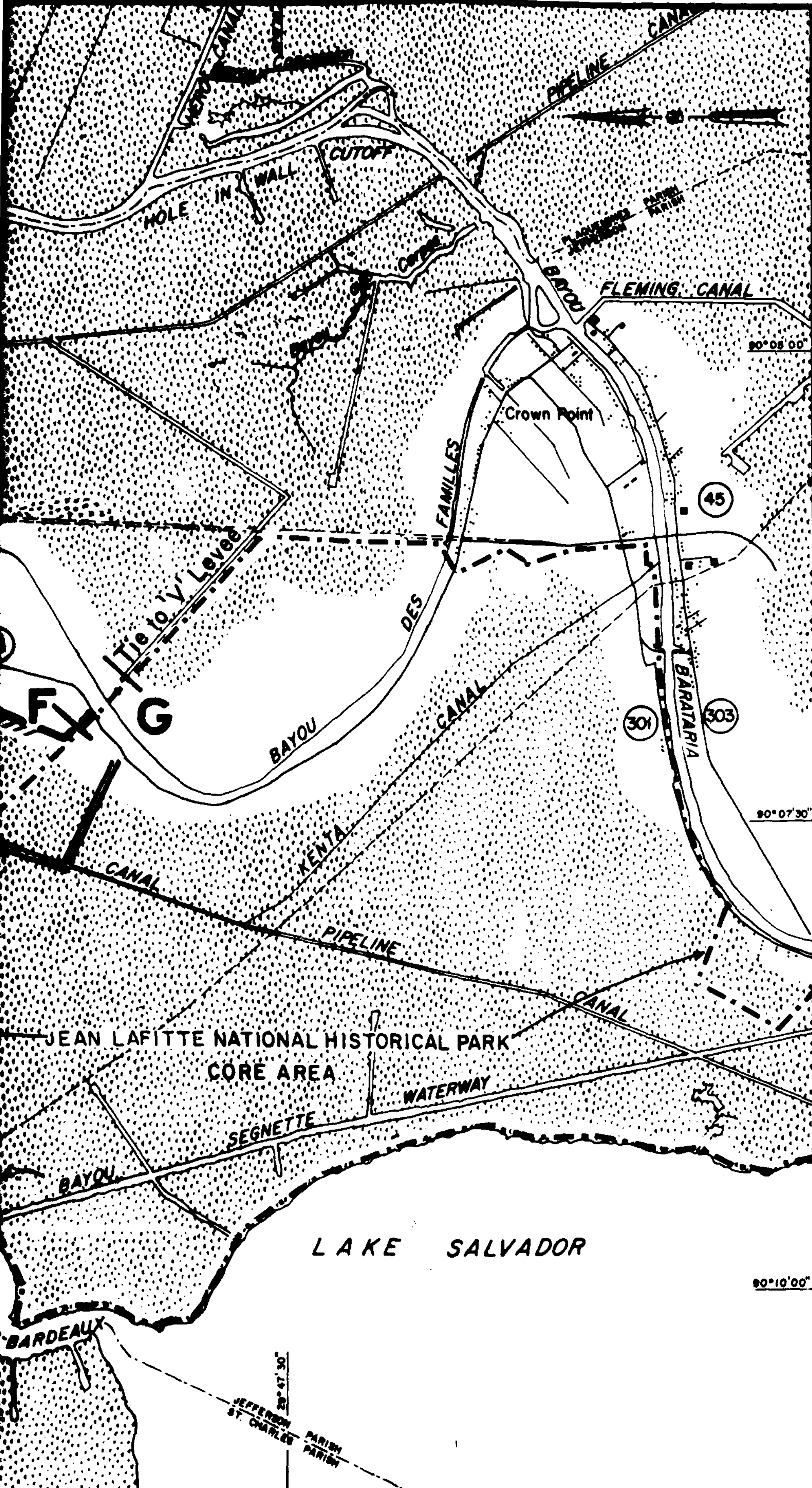


Harvey
INTRACOASTAL WATERWAY
HARVEY
HEPO
PIPELIN
90°06'00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
EXPRESSWAY
WEST BANK
Marrero
45
NEW ORLEANS
MISSISSIPPI RIVER
90
18
Tie to Ames Pumping Station Levee
Under Separate Project
A
3
E
BAYOU DES
90°07'30"
DUGUES CANAL
MILLAUDON CANAL
ESTELLE CANAL
WOODS PLACE
1
541
WESTWEGO
PARK
PROTEC
B
W
BAYOU
A
BS
BAYOU BOEUF
SEGNETTE
90°10'00"
MAIN CANAL

JSD 10V83



INTRACOASTAL
WATERWAY
HERO
CUTOFF
HERO CANAL
PIPELINE CANAL
HOLE IN WALL
CUTOFF
Bayou
FLEMING CANAL
BAYOU
Crown Point
FAMILLES
DES
BAYOU
45
Tie to 'V' Levee
F
G
on Levee
ect
BAYOU
DES
FAMILLES
45
BARATARIA
301
303
KENTA
ROSS CANAL
CANAL
KENTA
CANAL
PIPELINE
CANAL
DELERY CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
CORE AREA
RK PROTECTION ZONE
CANAL
BAYOU BOEUF
WATERWAY
SEGNETTE
BAYOU
LAKE SALVADOR
BAYOU
BARDEAUX
JEFFERSON PARISH
ST CHARLES PARISH
90°05'00"
90°07'30"
90°10'0
29°47'30"



LEGEND

ALTERNATIVE G ALINEMENT

AMES PUMPING STATION LEVEE (UNDER SEPARATE CONTRACT)

BS BAYOU SEGNETTE PUMPING STATION

W WESTWEGO PUMPING STATION

A AMES PUMPING STATION

LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

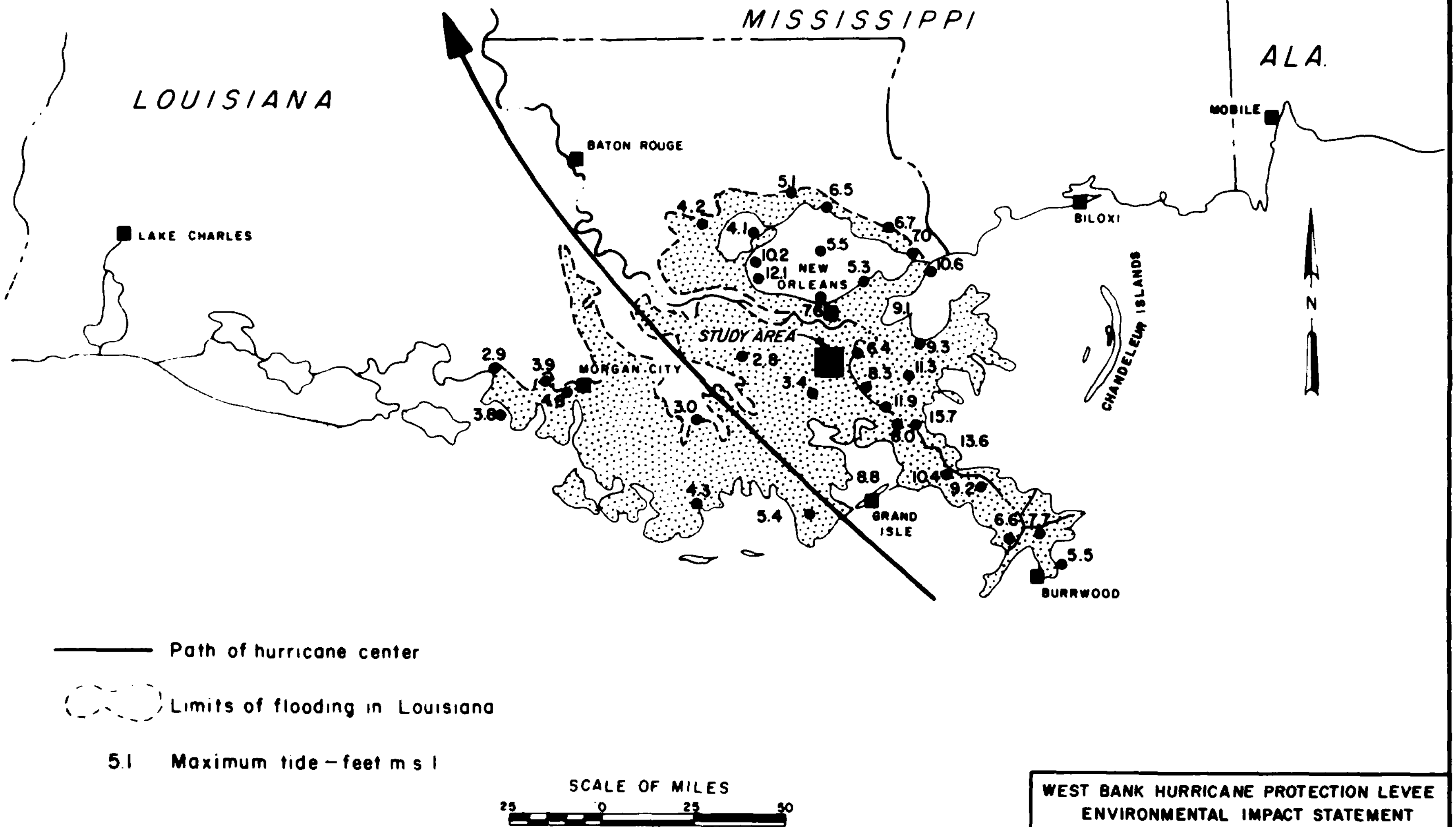
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE G

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

FEB. 84 H-2-29063

PLATE 13



Source: U.S. Army Corps of Engineers 1972

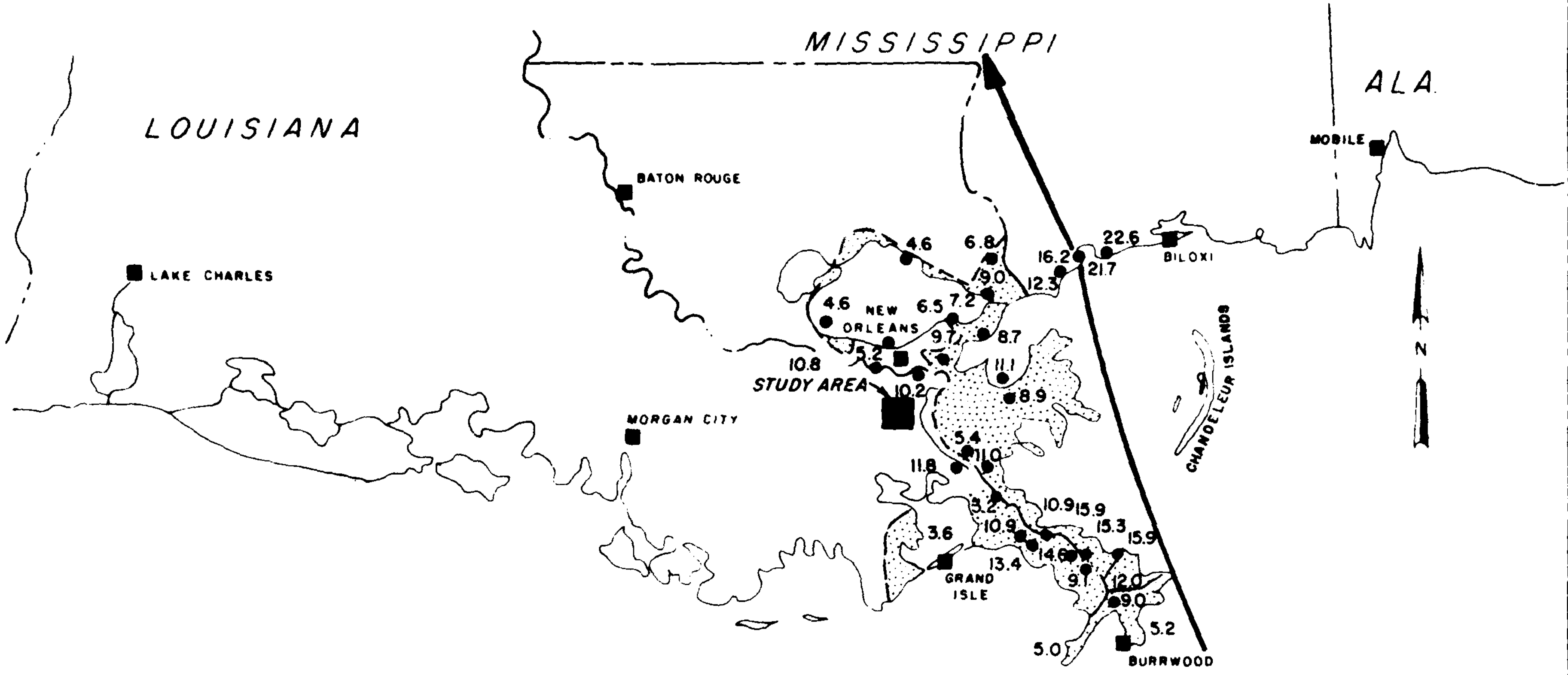
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

HURRICANE PATH (BETSY)
27 AUGUST – 12 SEPTEMBER 1965

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB. 1984 FILE NO. H-2-29663

PLATE 14



Path of hurricane center

Limits of flooding in Louisiana

51 Maximum tide - feet m s l

SCALE OF MILES

25 0 25 50

Source: U. S. Army Corps of Engineers 1972

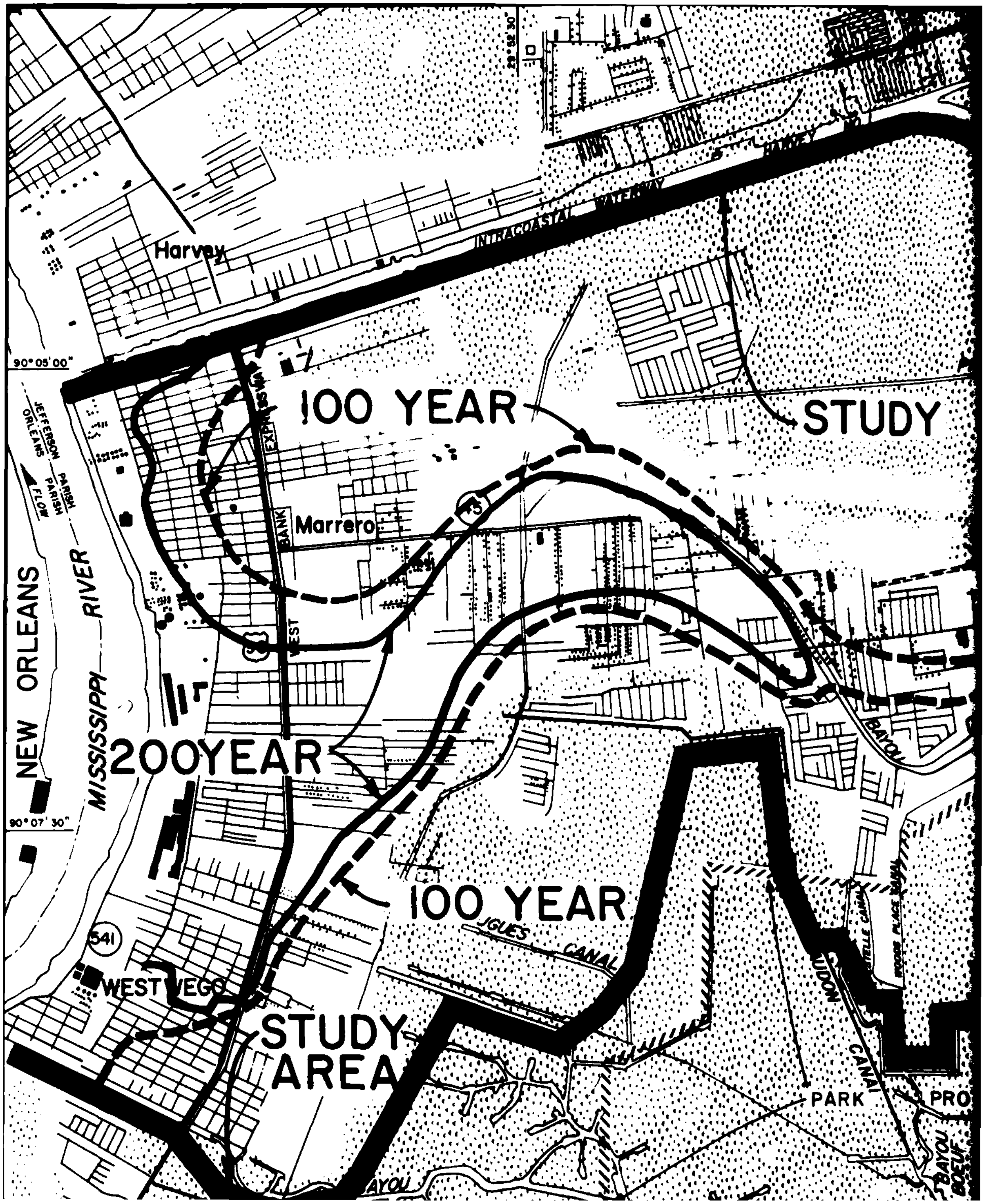
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

HURRICANE PATH (CAMILLE)
14 – 22 SEPTEMBER 1969

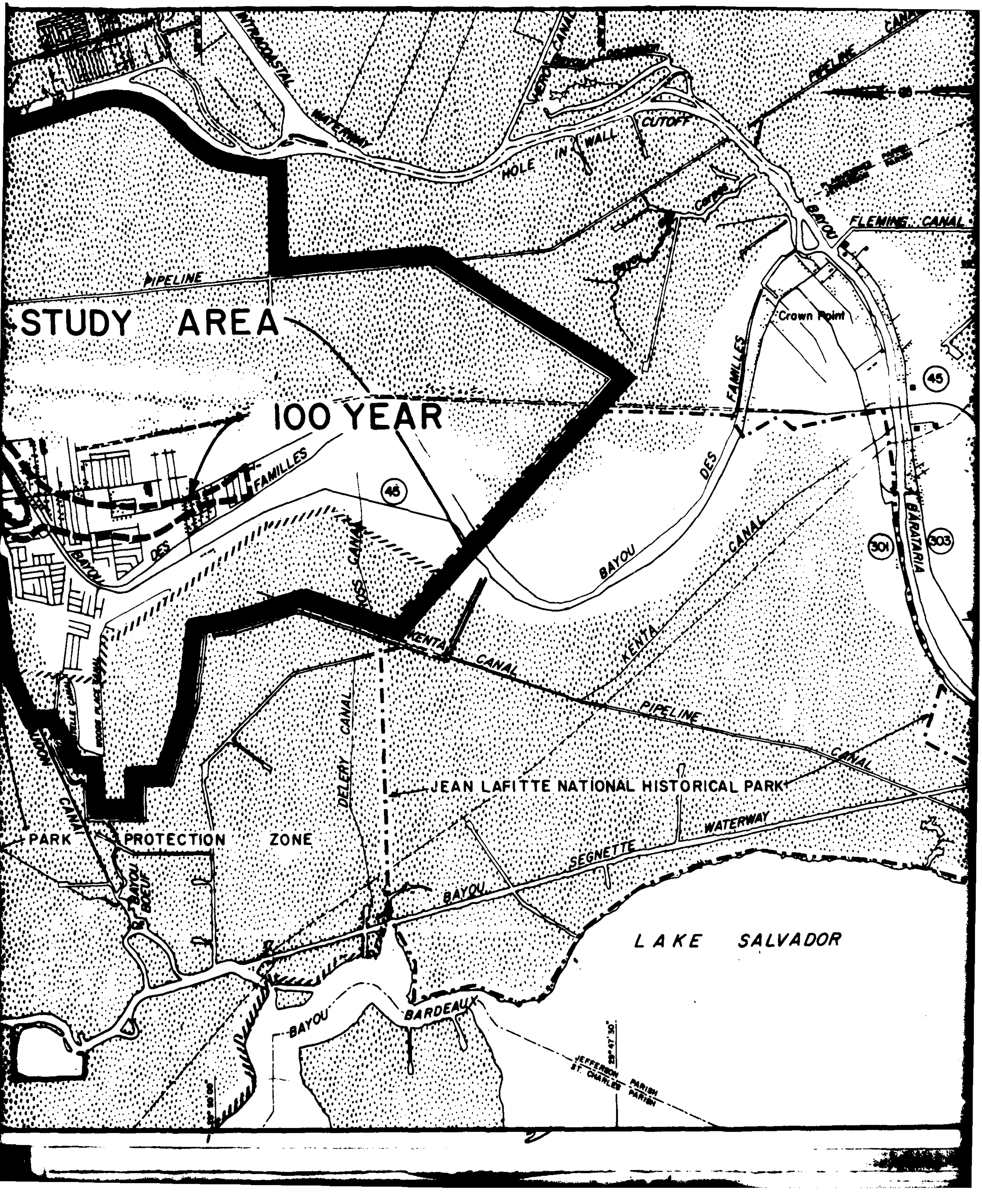
U S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

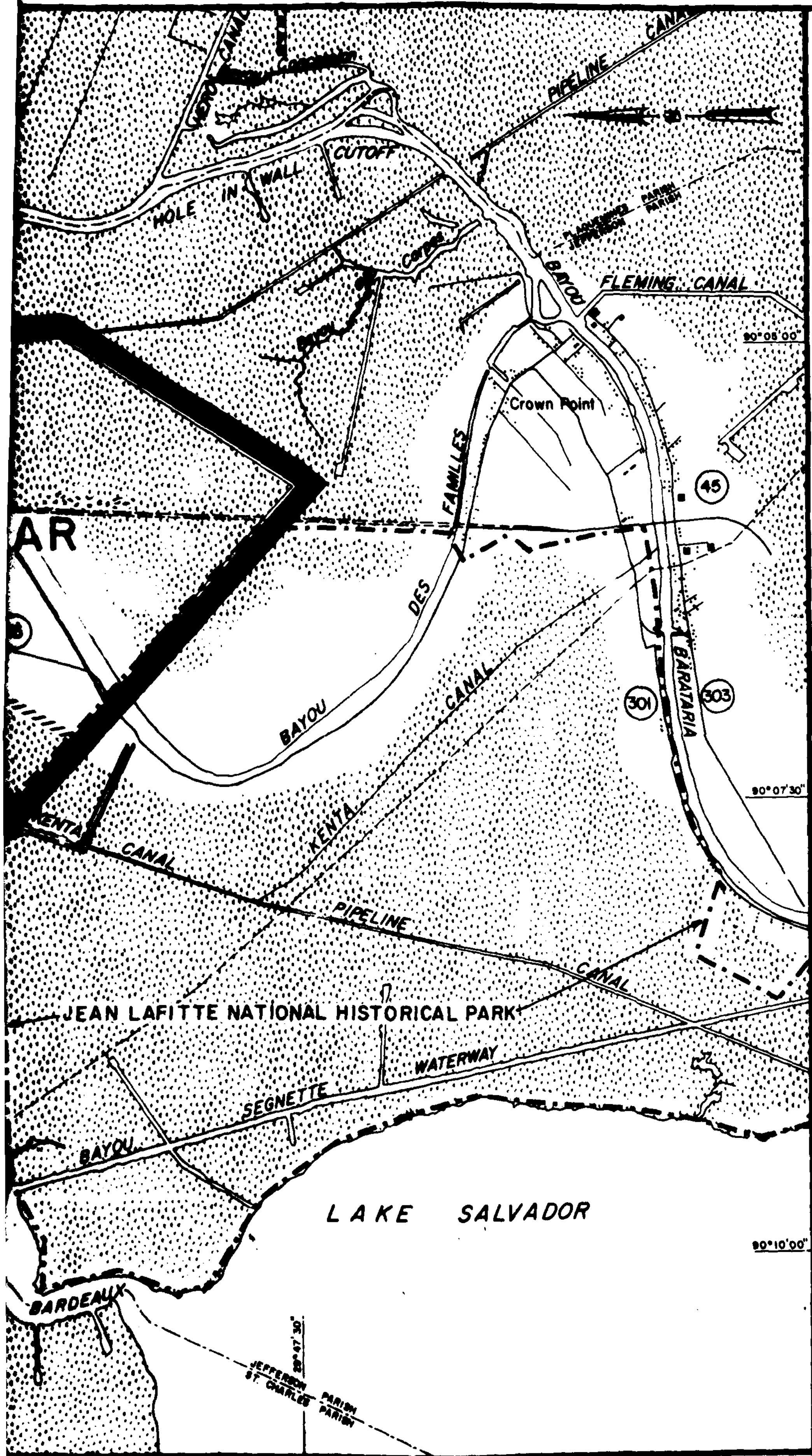
FEB 1984 FILE NO. H-2-29663

PLATE 15



Harvey
INTRACOASTAL WATERWAY
HARVEY
90°05'00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
100 YEAR
STUDY
EXPRESSWAY
WEST BANK
Marrero
NEW ORLEANS
MISSISSIPPI RIVER
200YEAR
90°07'30"
100 YEAR
CANAL
541
WESTWEGO
STUDY
AREA
BAYOU
PARK
PRO
BAYOU BOEUF


STUDY AREA
100 YEAR
INTRACOASTAL WATERWAY
HOLE IN WALL
CUTOFF
PIPELINE
PIPELINE CANAL
BAYOU
FLEMING CANAL
Crown Point
BAYOU DES FAMILLES
45
301
303
BARATARIA
KENTA CANAL
PIPELINE CANAL
DELERY CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
PARK PROTECTION ZONE
BAYOU BOEUF
BAYOU SEGNETTE WATERWAY
LAKE SALVADOR
BAYOU BARDEAUX
JEFFERSON PARISH
ST. CHARLES PARISH



LEGEND

STUDY AREA

200-YEAR OVERFLOW LIMIT

100-YEAR OVERFLOW LIMIT

SCALE IN FEET

2000 0 2000 4000 6000

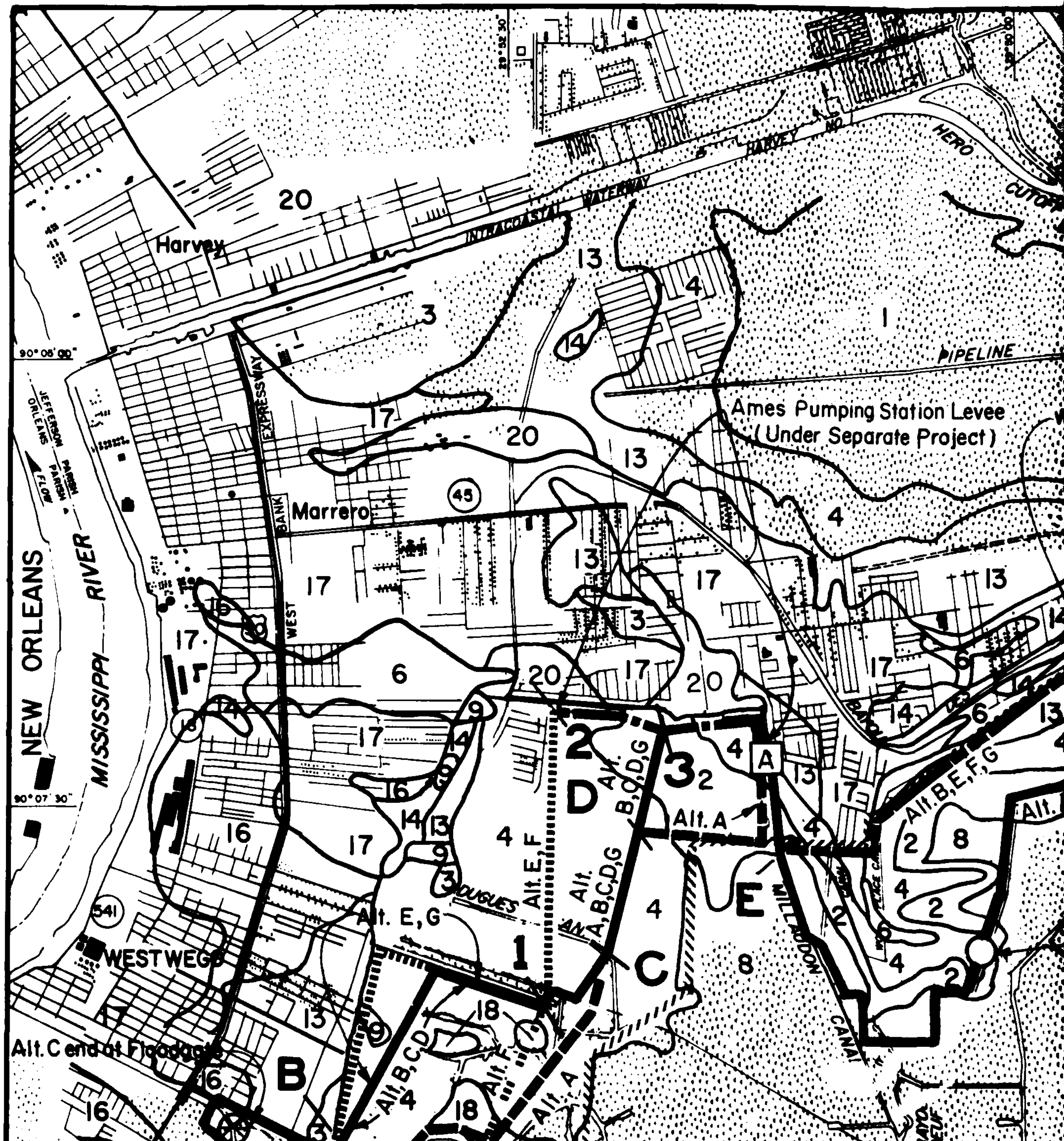
WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

LIMITS OF FLOODING

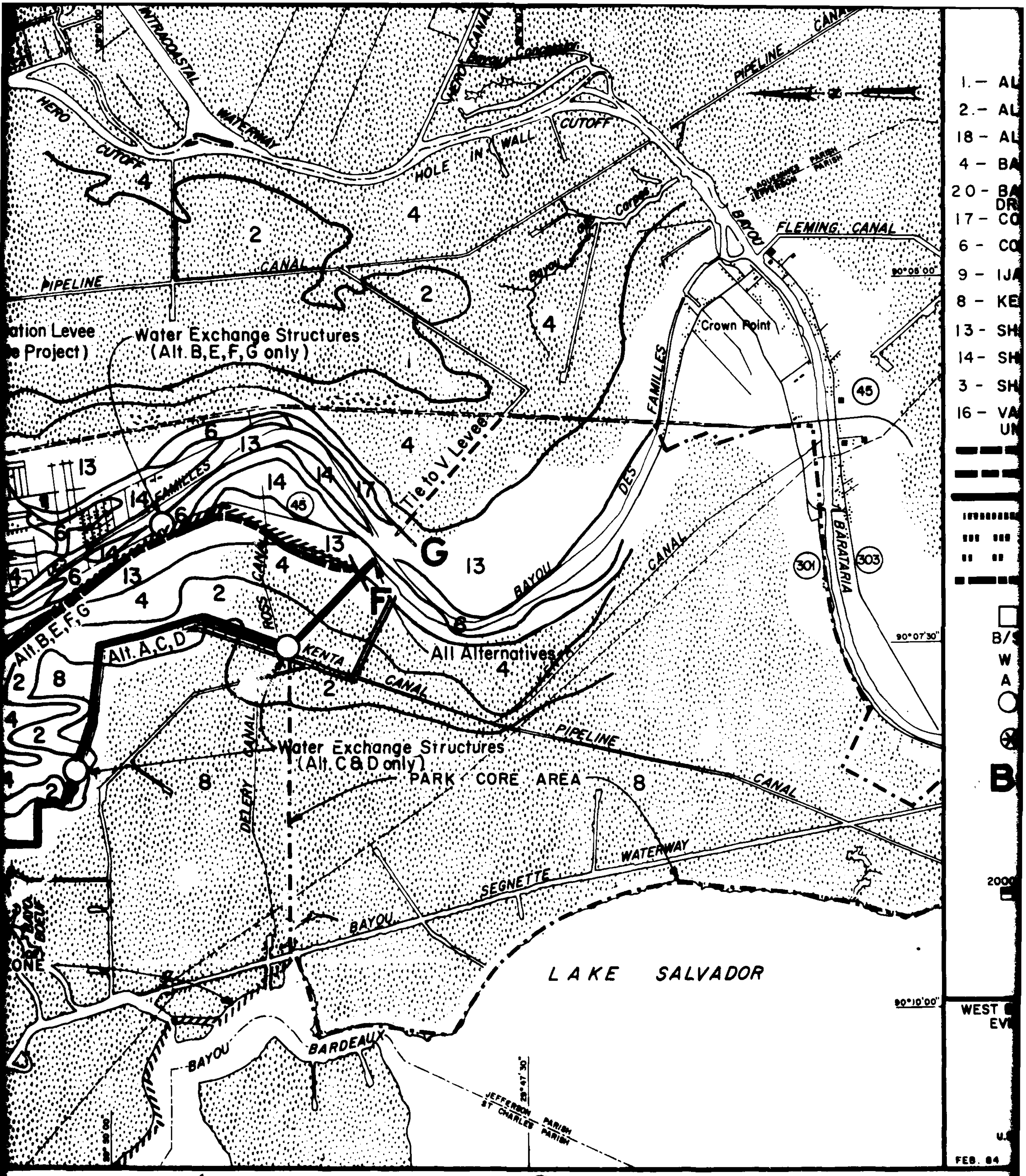
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

FEB. 84 H-2-29663

1 3 PLATE 16

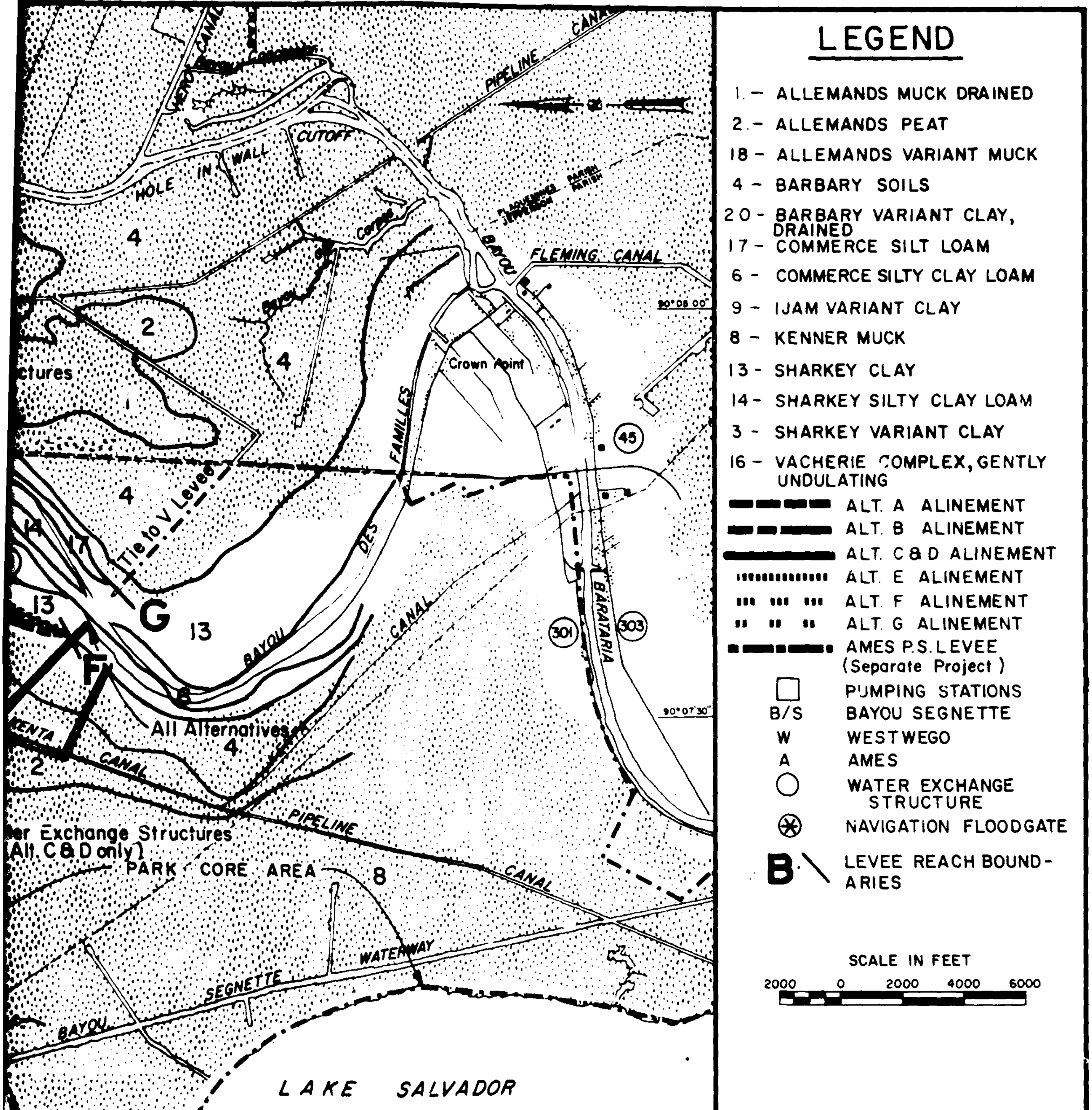


Harvey
INTRACOASTAL WATERWAY
HARVEY
HERO
CUTOFF
PIPELINE
Ames Pumping Station Levee
(Under Separate Project)
Marrero
WEST BANK EXPRESSWAY
NEW ORLEANS
MISSISSIPPI RIVER
JEFFERSON PARISH
ORLEANS PARISH
FLOW
WESTWEGO
Alt. C end at Floodgate
Alt. E, G
Alt. E, F
Alt. A, B, C, D, G
Alt. B, C, D, G
Alt. A
Alt. B, C, D
Alt. B, E, F, G
Alt. A, F
DUGUES CANAL
MILLAUDON CANAL
MAIN CANAL
BAYOU BOEUF
SEGNETTE
PARK PROTECTION ZONE
All Alternatives
90°05'00"
90°07'30"
90°10'00"
29°52'30"
29°50'00"



INTRACOASTAL
WATERWAY
HERO
CUTOFF
HERO CANAL
Bayou Coquille
PIPELINE
CANAL
CUTOFF
HOLE IN WALL
PLAQUEMINES PARISH
JEFFERSON PARISH
BAYOU
FLEMING CANAL
Bayou
PIPELINE
CANAL
Crown Point
...ation Levee
...e Project)
Water Exchange Structures
(Alt. B, E, F, G only)
Tie to V. Levee
FAMILLES
DES
BAYOU
CANAL
BARATARIA
G
F
ROSS CANAL
KENTA
CANAL
Alt. B, E, F, G
Alt. A, C, D
All Alternatives
Water Exchange Structures
(Alt. C & D only)
PARK CORE AREA
DELERY CANAL
PIPELINE
CANAL
WATERWAY
SEGNETTE
BAYOU
LAKE SALVADOR
BAYOU
BARDEAUX
JEFFERSON PARISH
ST CHARLES PARISH
45
301
303
90°05'00"
90°07'30"
90°10'00"
29°47'30"
1.- AL
2.- AL
18 - AL
4 - BA
20 - BA
DR
17 - CO
6 - CO
9 - IJA
8 - KE
13 - SH
14 - SH
3 - SH
16 - VA
UN
B/S
W
A
B
2000
WEST
EV
FEB. 84

1 2



WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

SOIL SERIES

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

FEB 84 H-2-29063

2 39 PLATE 17

AD-A138 878 DRAFT ENVIRONMENTAL IMPACT STATEMENT WEST BANK HURRICANE PROTECTION LEVEE JEFFERSON PARISH LOUISIANA (U) ARMY ENGINEER DISTRICT NEW ORLEANS LA FEB 84

3/3

UNCLASSIFIED F/G 13/2 NL

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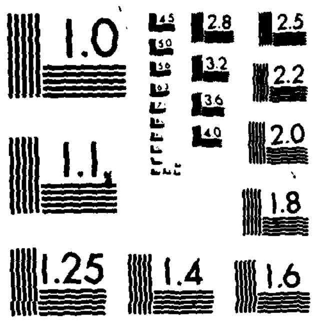
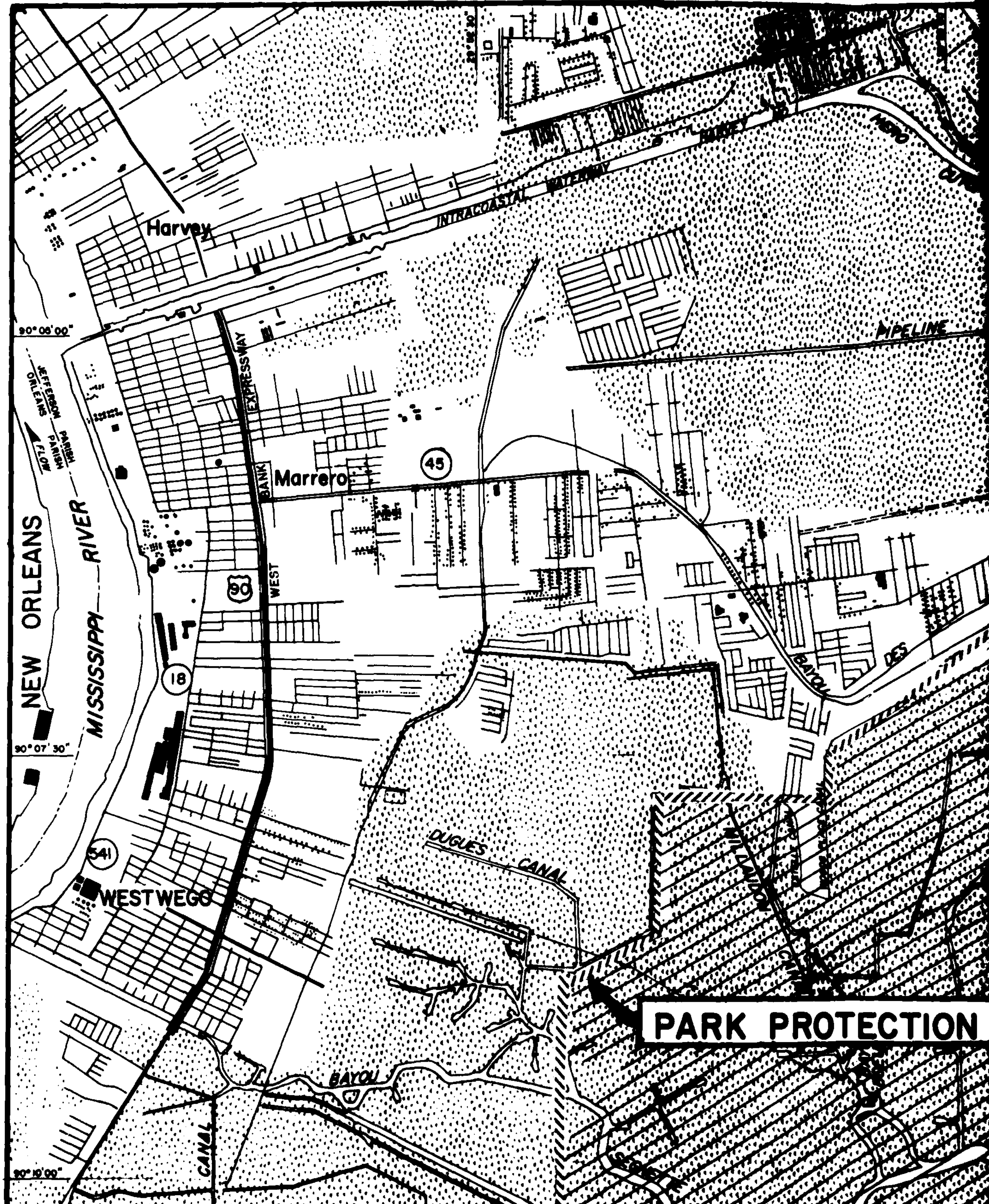
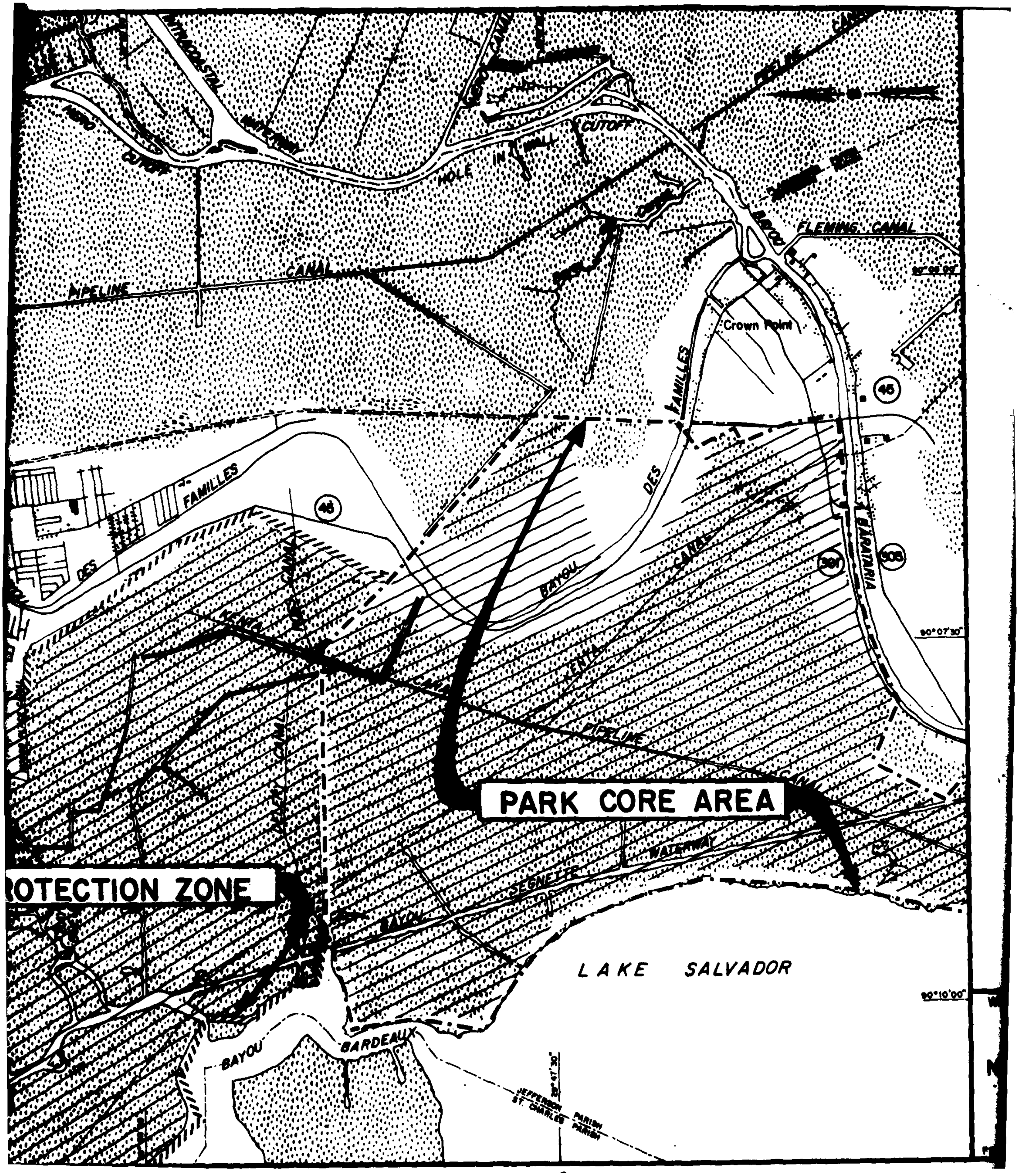
DATE FILMED
4-84
DTIC



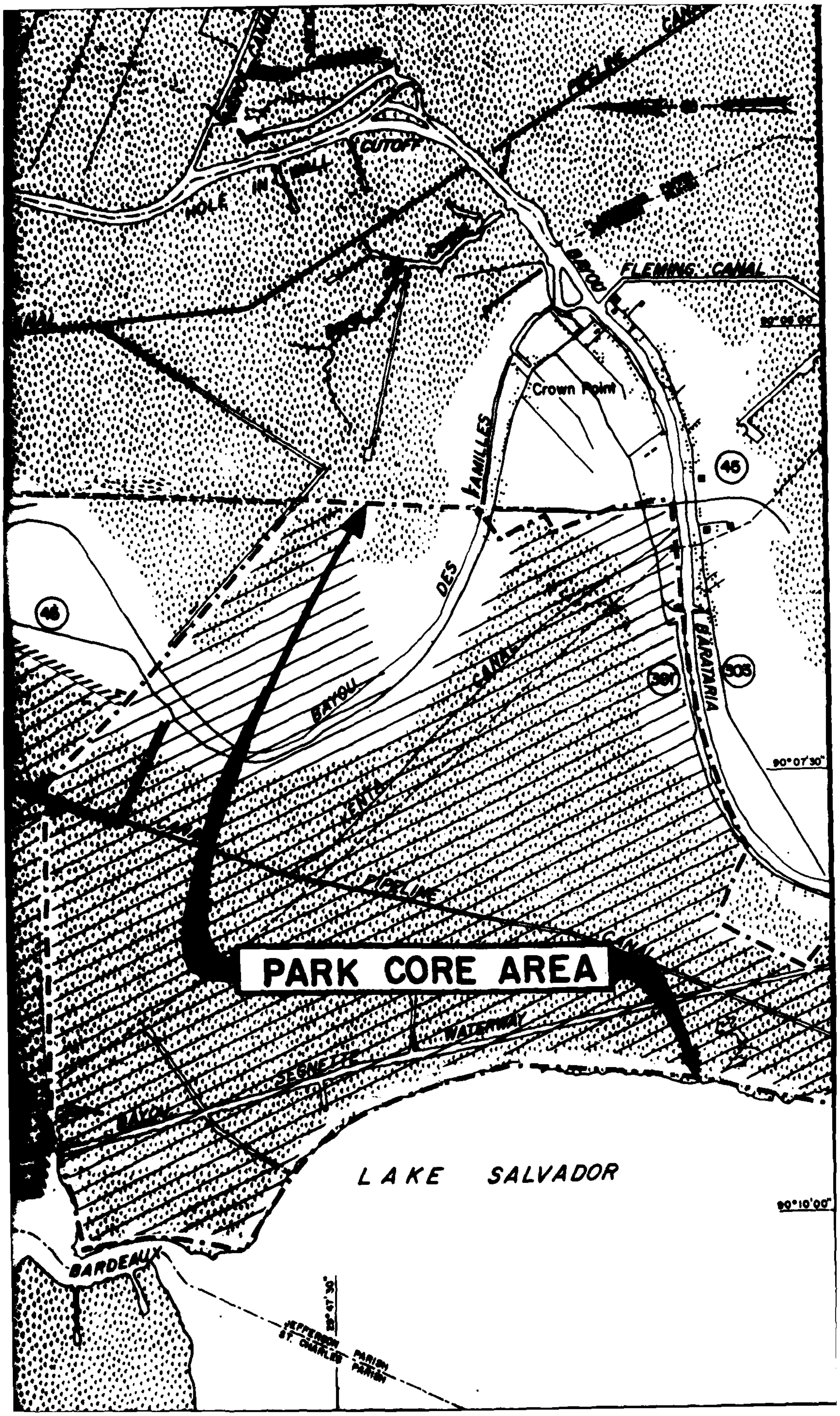
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



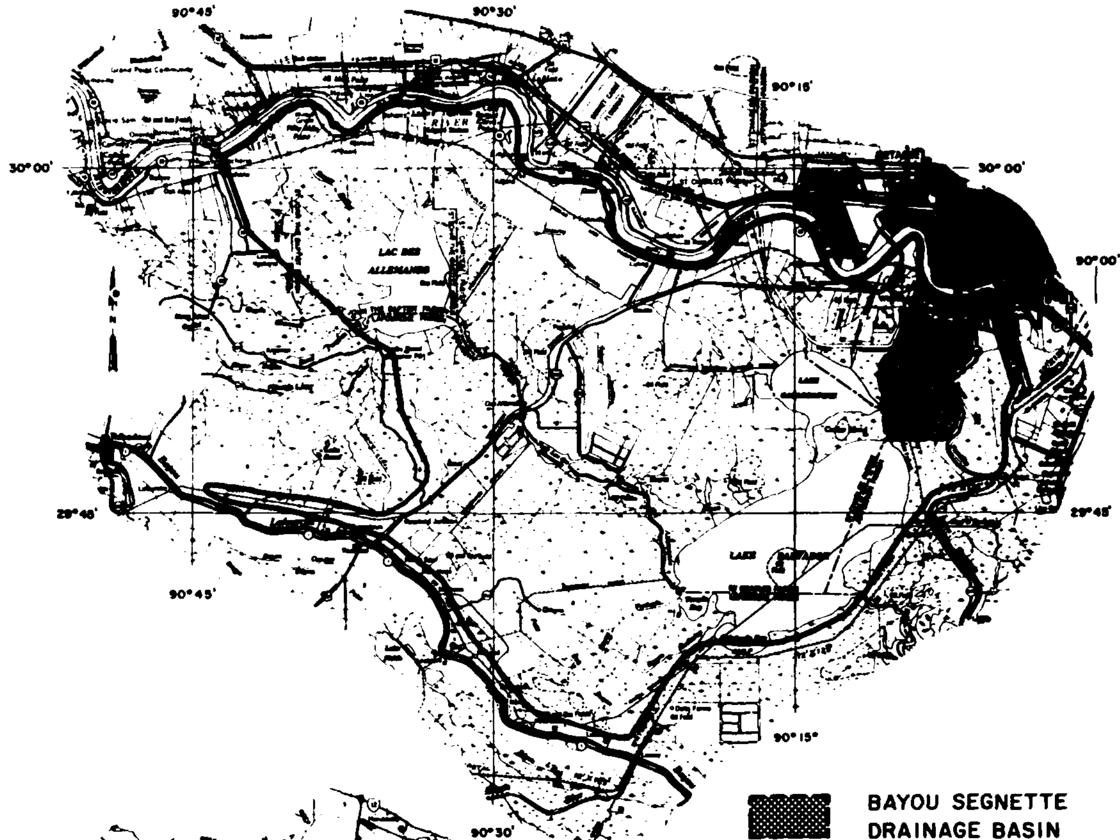
Harvey
INTRACOASTAL WATERWAY
HARVEY
PIPELINE
90° 08' 00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
WEST BANK EXPRESSWAY
45
Marrero
NEW ORLEANS
MISSISSIPPI RIVER
90
18
BAYOU DES
90° 07' 30"
DUGUES CANAL
541
WESTWEGO
PARK PROTECTION
BAYOU
MAIN CANAL
90° 10' 00"



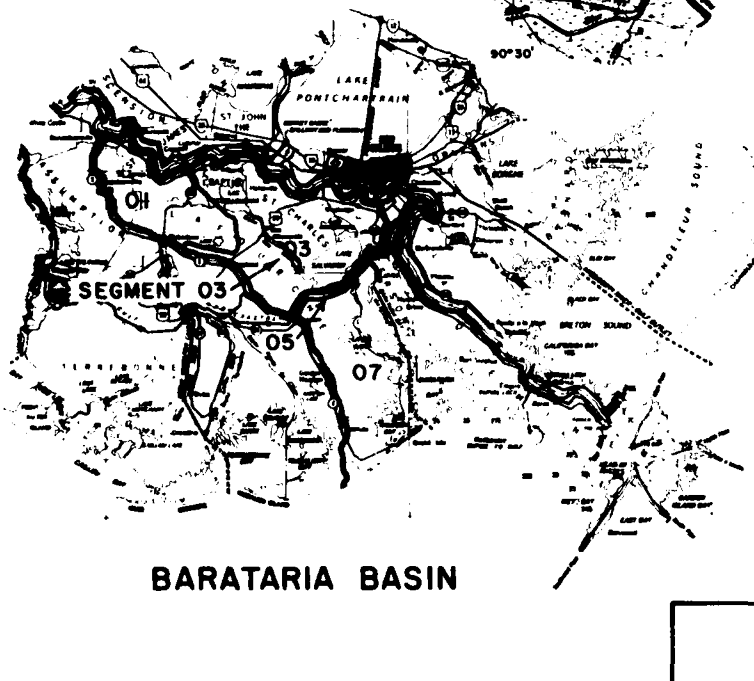
PARK CORE AREA
ROTECTION ZONE
LAKE SALVADOR
Crown Point
FLEMING CANAL
PIPELINE CANAL
HOLE IN WALL CUTOFF
BAYOU DES FAMILLES
BARATARIA
KENTA CANAL
PIPELINE
SEGNETTE WATERWAY
BAYOU SEGNETTE
BAYOU BARDEAUX
INTRACOASTAL WATERWAY
JEFFERSON PARISH
ST. CHARLES PARISH
45
301
305
90°05'00"
90°07'30"
90°10'00"
29°47'30"


PARK CORE AREA
LAKE SALVADOR
Crown Point
FLEMING CANAL
BARATARIA
BAYOU DES FAMILLES
HOLE IN WALL
CUTOFF
BAYOU SEGNETTE WATERWAY
PIPELINE
BARDEAUX
JEFFERSON PARISH
ST. CHARLES PARISH
90°07'30"
90°10'00"

SEGMENT 03



BAYOU SEGNETTE DRAINAGE BASIN



BARATARIA BASIN

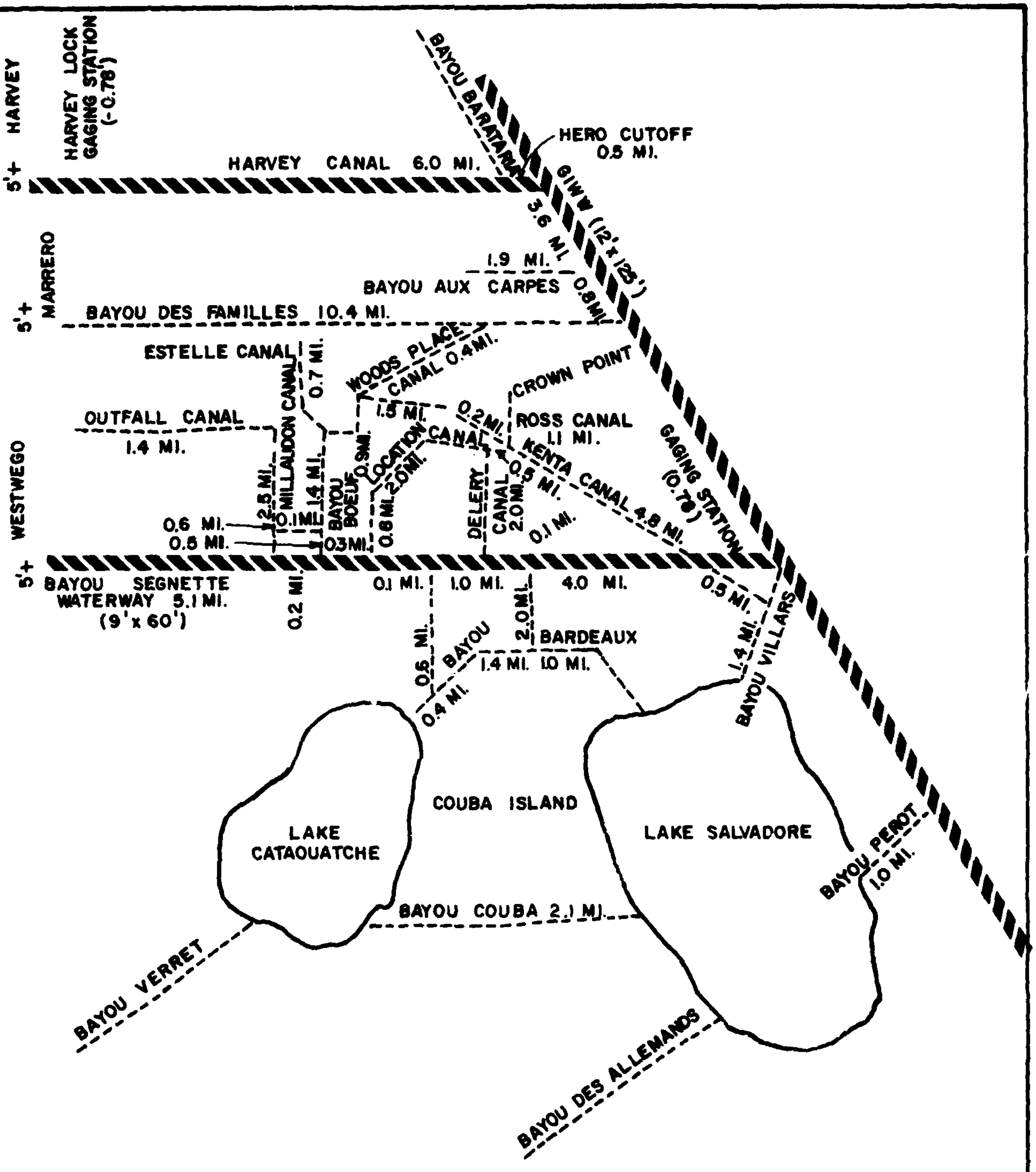
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

SEGMENT 03-BARATARIA BASIN INCLUDING BAYOU SEGNETTE DRAINAGE BASIN

U S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB 1984 FILE NO. H-29663

PLATE 19



AREA OF PROPOSED AFFECTED WATERWAYS

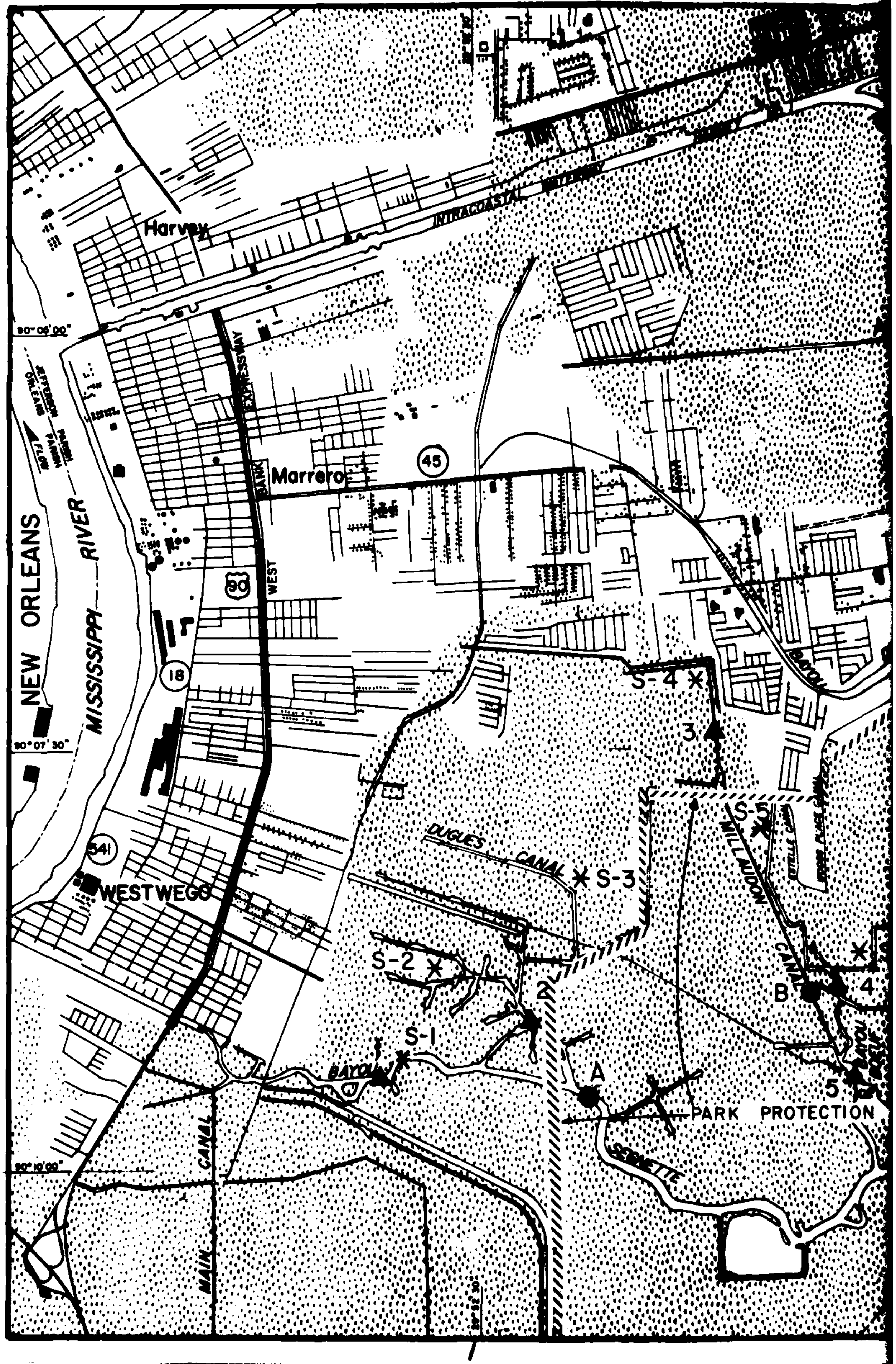
WEST BANK HURRICANE PROTECTION LEVEE
ENVIRONMENTAL IMPACT STATEMENT

SURFACE WATER FLOW REGIME
BAYOU SEGNETTE DRAINAGE BASIN

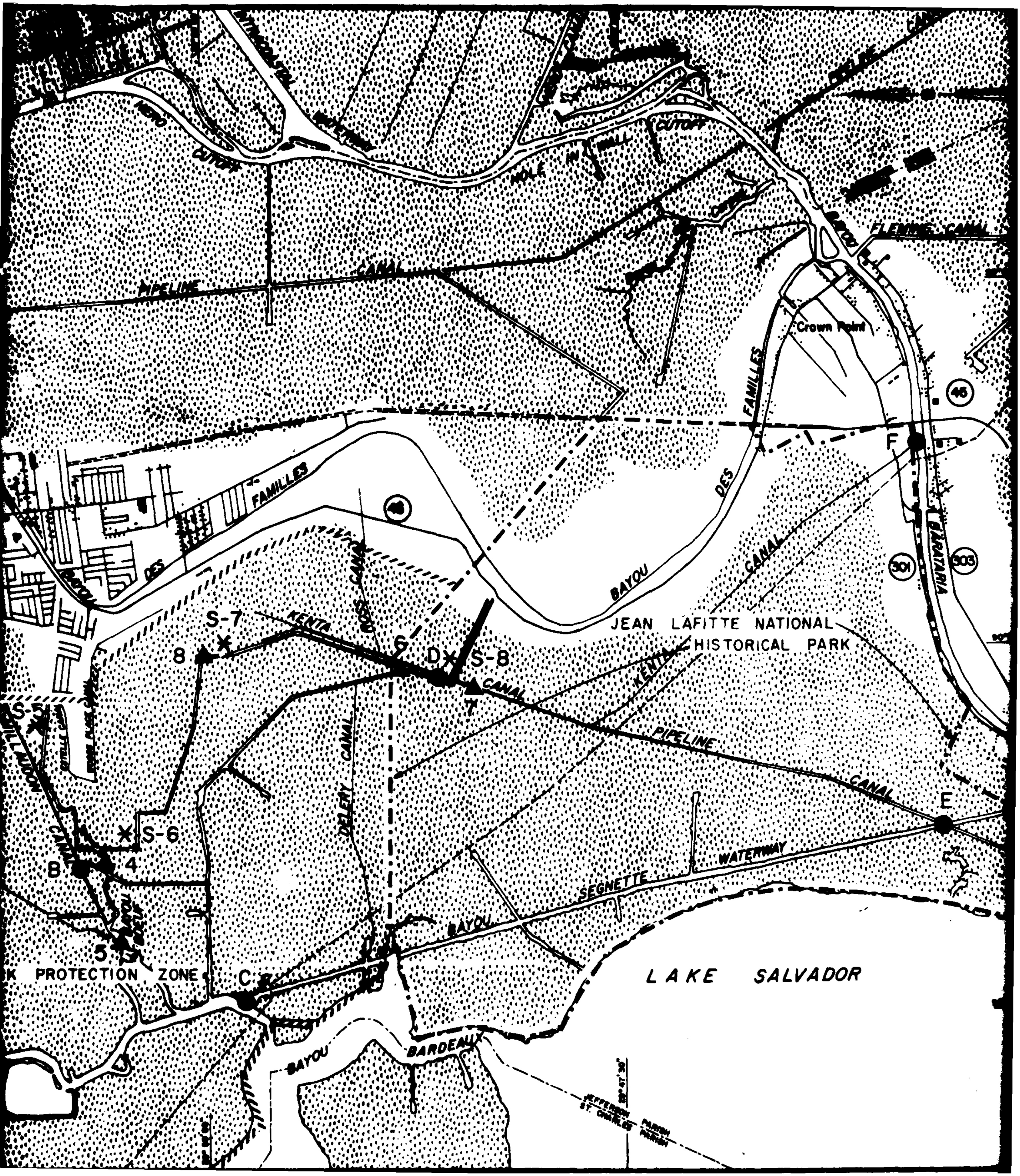
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FEB 1984 FILE NO H-2-29683

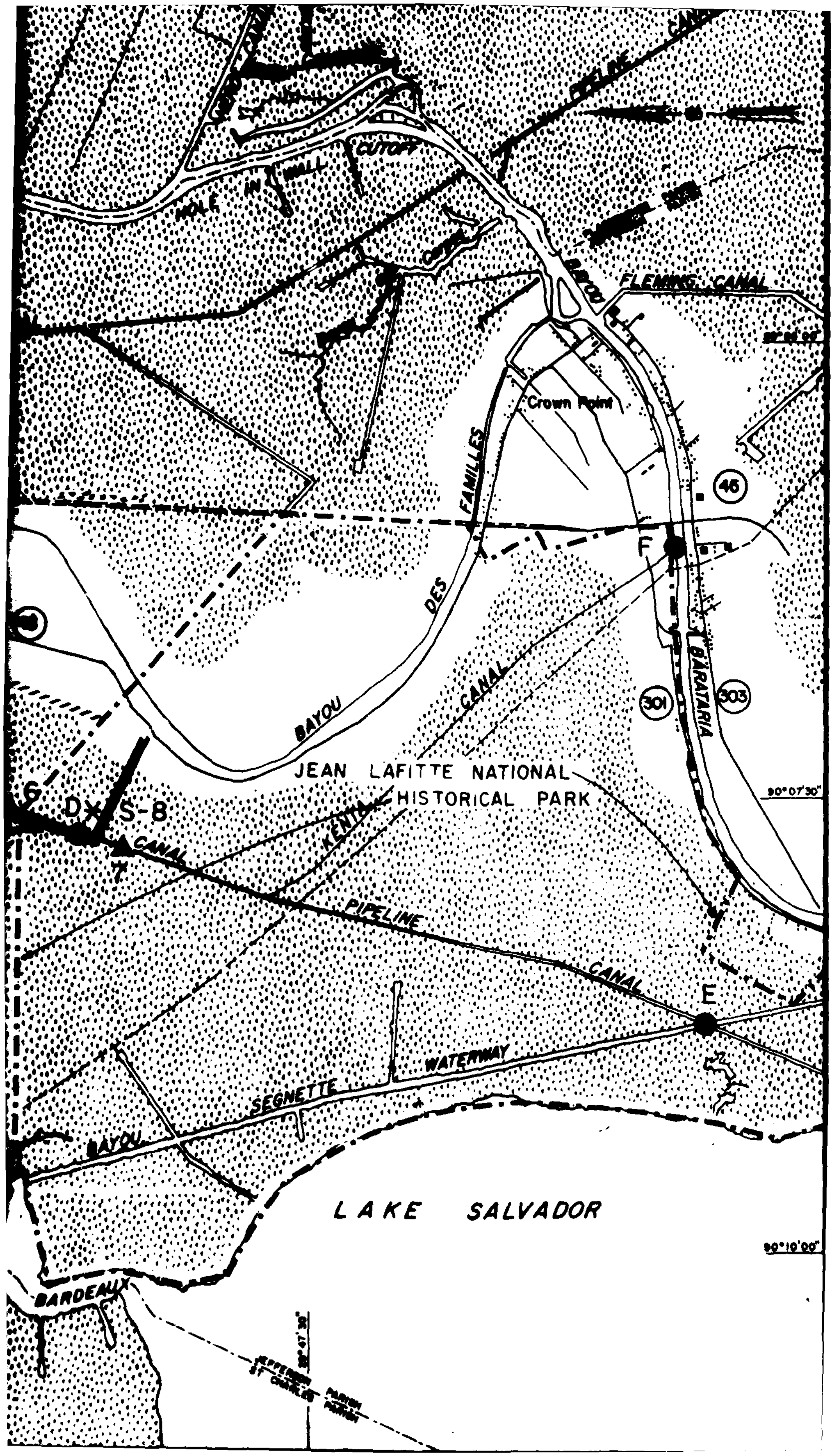
PLATE 20



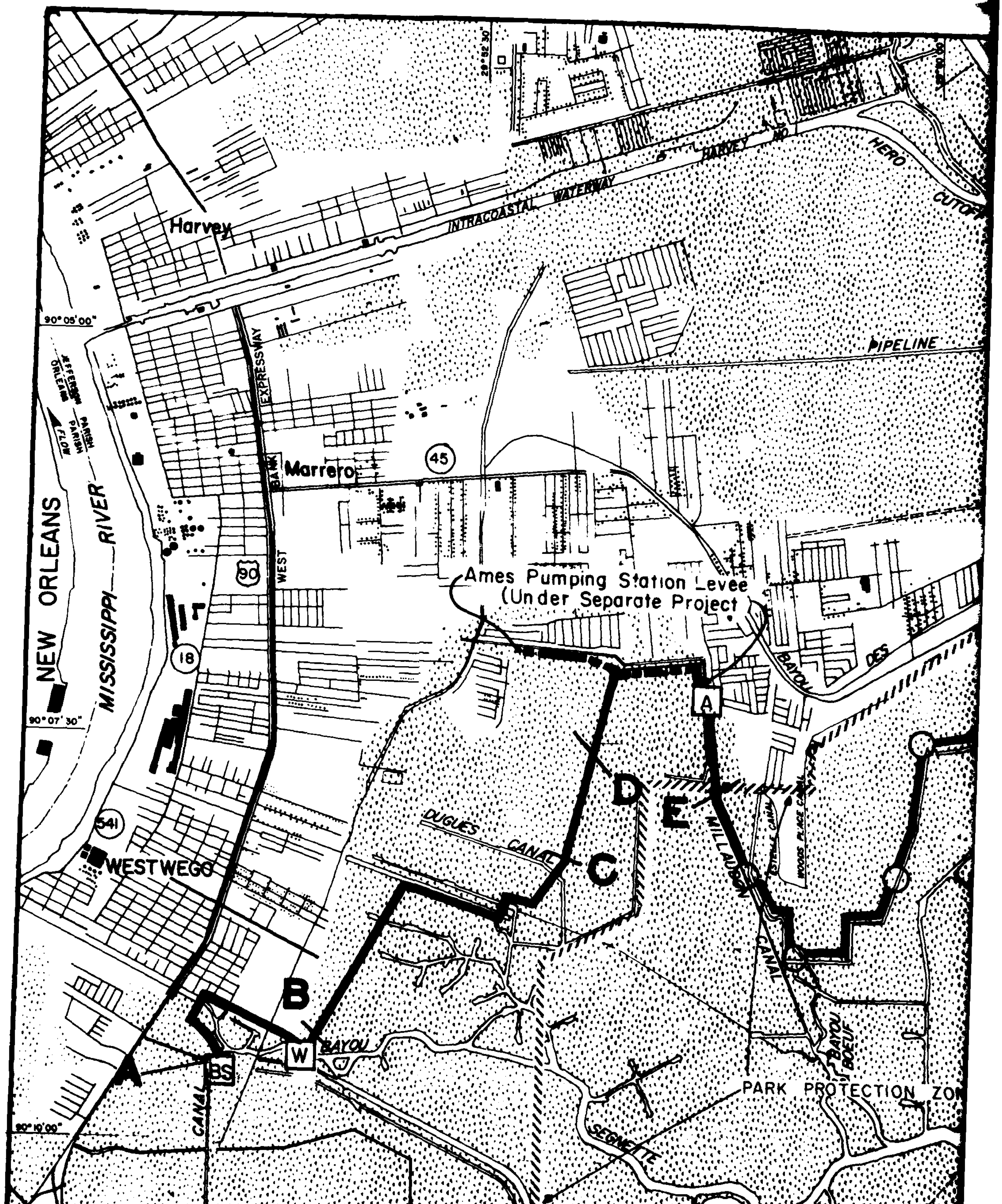
Harvey
INTRACOASTAL WATERWAY
90°08'00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
WEST BANK EXPRESSWAY
Marrero
45
NEW ORLEANS
MISSISSIPPI RIVER
90
18
90°07'30"
S-4
3
S-5
DUGUES CANAL
S-3
MILL AUDON CANAL
541
WESTWEGO
S-2
2
B
4
S-1
BAYOU
A
5
PARK PROTECTION
SEGNETTE
90°10'00"
MAIN CANAL



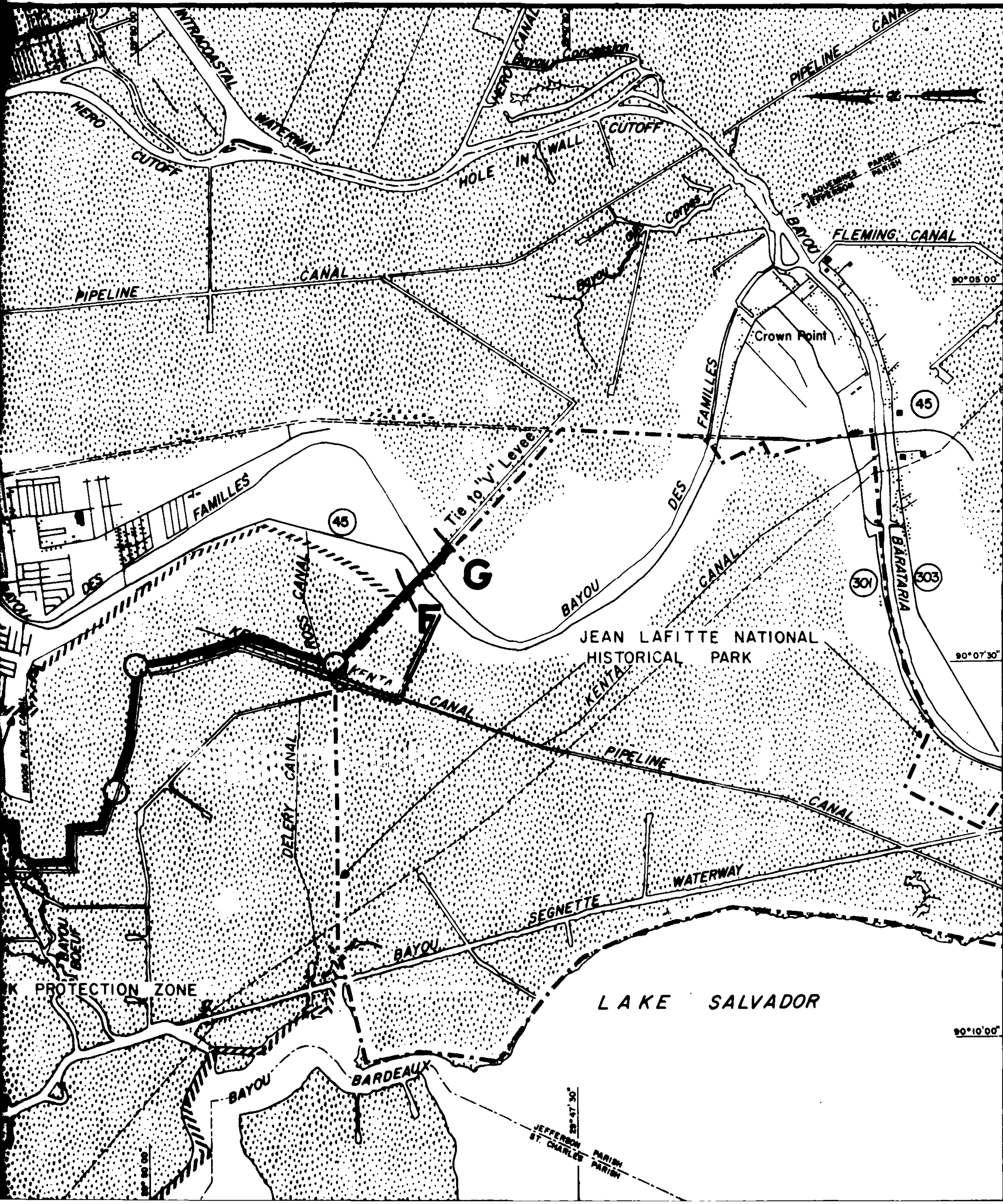
PIPELINE CANAL
HOLE IN WALL CUTOFF
FLEMING CANAL
Crown Point
BAYOU DES FAMILLES
BARATARIA
46
45
301
303
JEAN LAFITTE NATIONAL HISTORICAL PARK
KENTA CANAL
PIPELINE CANAL
BOSS CANAL
DELERY CANAL
S-7
S-8
S-5
S-6
8
7
4
5
B
C
D
E
F
G
BAYOU SEGNETTE WATERWAY
K PROTECTION ZONE
LAKE SALVADOR
BAYOU BARDEAUX
JEFFERSON PARISH
ST CHARLES PARISH



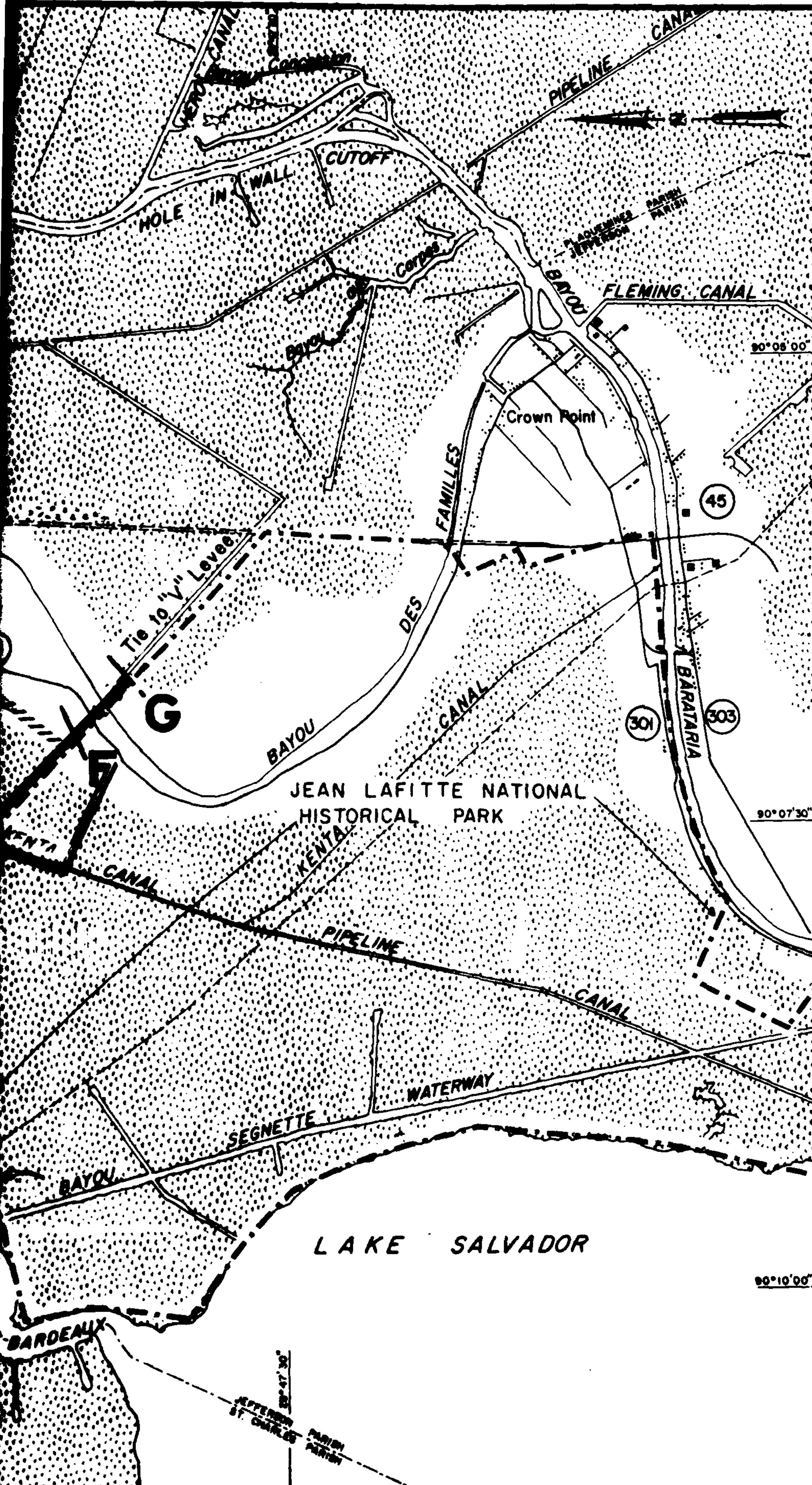
HOLE IN WALL
CUTOFF
FLEMING CANAL
Crown Point
FAMILLES
DES
BAYOU
45
F
BARATARIA
301
303
CANAL
JEAN LAFITTE NATIONAL
HISTORICAL PARK
90°07'30"
G
D
S-8
CANAL
KENTA
7
PIPELINE
CANAL
E
WATERWAY
SEGNETTE
BAYOU
LAKE SALVADOR
90°10'00"
BARDEAUX
JEFFERSON PARISH
ST CHARLES PARISH



Harvey
INTRACOASTAL WATERWAY
HARVEY NO
HERO CUTOFF
PIPELINE
90° 05' 00"
JEFFERSON PARISH
ORLEANS PARISH
FLOW
EXPRESSWAY
WEST BANK
Marrero
45
NEW ORLEANS
MISSISSIPPI RIVER
90
WEST
Ames Pumping Station Levee
(Under Separate Project
18
90° 07' 30"
A
BAYOU DES
D
E
DUGUES CANAL
C
MILLAUDON CANAL
WOODS PLACE CANAL
541
WESTWEGO
B
W
BAYOU
BS
A
PARK PROTECTION ZO
BAYOU BOEUF
90° 10' 00"
CANAL
MAIN
SEGNETTE
29° 52' 30"
29° 50' 00"



INTRACOASTAL WATERWAY
HERO CUTOFF
HERO CANAL
Bayou Concession
PIPELINE CANAL
HOLE IN WALL CUTOFF
PLAQUEMINES PARISH
JEFFERSON PARISH
Bayou Corpes
BAYOU
FLEMING CANAL
90°05'00"
PIPELINE CANAL
Crown Point
FAMILLES
45
Tie to "V" Levee
BAYOU DES FAMILLES
G
F
ROSS CANAL
KENTA CANAL
JEAN LAFITTE NATIONAL HISTORICAL PARK
BARATARIA
301
303
90°07'30"
DELERY CANAL
KENTA
PIPELINE CANAL
WATERWAY
SEGNETTE
BAYOU
BAYOU BOEUF
PROTECTION ZONE
LAKE SALVADOR
90°10'00"
BAYOU BARDEAUX
29°47'30"
JEFFERSON PARISH
ST. CHARLES PARISH



LEGEND

- ALT. D ALINEMENT
- AMES PUMPING STATION LEVEE (UNDER SEPARATE PROJECT)
- BS — BAYOU SEGNETTE PUMPING STATION
- W — WESTWEGO PUMPING STATION
- A — AMES PUMPING STATION
- WATER EXCHANGE STRUCTURE
- E — LEVEE REACH BOUNDARIES

SCALE IN FEET

2000 0 2000 4000 6000

WEST BANK HURRICANE PROTECTION LEVEE
EVIRONMENTAL IMPACT STATEMENT

ALTERNATIVE D WITH MITIGATION MEASURES

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEER

FEB. 84 H-2-28

END

DATE
FILMED

4-84

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